REPORT ON

ON-SHORE AND OFF-SHORE SUBSURFACE INVESTIGATION

CENTRAL VERMONT RAILWAY-OPTION PROPERTY BURLINGTON, VERMONT

Prepared For:

CENTRAL VERMONT RAILWAY
ST. ALBANS, VERMONT

25 April 1986

Prepared By:

ROY F. WESTON, INC.
2 Chenell Drive
Concord, New Hampshire 03301

WO#2715-02-01

TABLE OF CONTENTS

SECTION		PAGE NO
1	INTRODUCTION	1
2	PHYSICAL SETTING AND SITE HISTORY	3
	2.1 Location and Topography	3
	2.2 Physiographic Setting, Drainage, and Climate	3
	2.3 Geology	6
	2.4 Site History	7
	2.5 Previous Investigations	8
3	ON-SHORE INVESTIGATION	10
	3.1 Field Methods	10
	3.1.1 Drilling, Soil Sampling and Well Construction	10
	3.1.2 Monitor Well Slug Testing	14
	3.1.3 Water Level Survey	16
	3.1.4 Groundwater Sampling	19
	3.2 Results	21
	3.2.1 Site Hydrogeology	21
	3.2.2 Analytical Results for Soils	28
	3.2.3 Groundwater Quality	30
	3.3 Conclusions	35
4	OFF-SHORE INVESTIGATION	37
	4.1 Field Methods	37
	4.2 Results	41
	4.2.1 Substrate Conditions	41
	4.2.2 Analytical Results for Off-Shore Samples	42
	4.3 Conclusions	50

Table of Contents (Cont.)

PAGE NO

REFERENCES 52

APPENDICES

A. ON-SHORE INVESTIGATION

A-1 Monitor Well Logs
A-2 Slug Test Data
A-3 Analytical Data Reports - Soils
A-4 Analytical Data Reports - Groundwater

B. OFF-SHORE INVESTIGATIONS

B-1 Off-Shore Boring Logs
B-2 Analytical Data Reports

LIST OF TABLES

		PAGE NO
1.	Summary of Field Work Schedule, On-Shore Investigation, CV-Option Property, 1985 - 1986	11
2.	Summary of Monitor Well Construction Details	15
3.	Summary of Monitor Well Slug Test Results	17
4.	Summary of Groundwater Level Survey Data, December 1985 - January 1986	18
5.	Summary of Field-Tested Water Quality Parameters	20
6.	Summary of VOC Concentrations in Soils	29
7.	Summary of VOC Concentrations in Groundwater	31
8.	Summary of Semi-Volatile Concentrations in Groundwater	33
9.	Summary of Phenol, Cyanide, and Metals Concentrations in Groundwater	34
10.	Summary of VOC Concentrations in Off-Shore Samples	43
11.	Summary of Semi-Volatile Concentrations in Off-Shore Samples	45
12.	Summary of Inorganic Concentrations in Off-Shore Samples, Bulk Sediments	46
13.	Summary of Inorganic Concentrations in Off-Shore Samples, Elutriates and Lake Water	47
14.	Summary of Water Quality Standards and Criteria for Inorganic Parameters in Water	49

LIST OF FIGURES

		PAGE NO
1.	Location Map, CV-Option Property	4
2.	Site Map, CV-Option Property	5
3.	Monitor Well Location Map, CV-Option Property	12
4.	Location Map for Geologic Cross-Sections, CV-Option Property	22
5.	Diagrammatic Geologic Cross-Section AA', CV-Option Property	23
6.	Diagrammatic Geologic Cross-Section BB', CV-Option Property	24
7.	Water Table Map and Flow Chart, 29 January 1986, CV-Option Property	26
8.	Off-Shore Sampling Station Locations, CV-Option Property	38
9.	Summary of Off-Shore Sampling and Analytical Protocol, CV-Option Property	40

SECTION 1

INTRODUCTION

This report describes the findings of on-shore and off-shore investigations performed by Roy F. Weston, Inc. (WESTON), for Central Vermont Railway (CV). The investigations were performed at the CV-Option Property on the waterfront in Burlington, Vermont.

This lakeshore property may be developed in the future for combined residential and commercial use, and the adjoining harbor area may be dredged for construction of a marina. Preliminary development plans were submitted by the Alden Waterfront Corporation (Alden) for review to both the Vermont Agency of Environmental Conservation, Department of Water Resources and Environmental Engineering (VAEC) and to the U.S. Army Corps of Engineers, New England Division (COE-NED). Both the VAEC and the COE-NED requested that additional testing of proposed dredge and spoil material off-shore be performed. In addition, the VAEC requested that a site investigation, including well installation and groundwater testing, be performed on-shore in the area of a former bulk oil storage yard. A work plan addressing both requests was prepared by WESTON for Alden and submitted in August 1985 to both the VAEC and the COE-NED. Alden subsequently decided not to proceed with the site studies, and CV requested WESTON to modify the work plan in response to agency comments and resubmit the work plan directly for CV. The work plan was re-submitted and approved (with minor modifications in the analytical protocol) in December 1985. WESTON has maintained communications with the concerned agencies since that time to keep them apprised of project status.

The purpose of the on-shore hydrogeologic investigation was to evaluate subsurface conditions beneath the property, specifically the occurrence and flow direction(s) of groundwater and the presence of contamination, if any, in soils and water. The work scope and findings of the on-shore hydrogeologic investigation are described in Section 3 of this report. The work was performed with the approval of the Hazardous Materials Management Program of the VAEC.

The purpose of the off-shore investigation was to determine the suitability for dredging of near-shore lake sediments in the inner harbor adjacent to the site, and the potential water quality impacts from such dredging. The work scope and findings of the off-shore investigation are described in Section 4 of this report. The work was performed with the approval of the Regulatory Branch of the U.S. Army Corps of Engineers, New England Division and the Water Quality Division of VAEC.

SECTION 2

PHYSICAL SETTING AND SITE HISTORY

2.1 LOCATION AND TOPOGRAPHY

The CV-Option property (the "property" or the "site") is located in the City of Burlington, on the shoreline of Lake Champlain, within the Burlington Harbor area (Figure 1). It includes several parcels of land owned by Central Vermont Railway, bounded by Lake Street to the east, the Burlington Water Plant and U.S. Coast Guard Station to the north, College Street to the south and Lake Champlain (inner harbor) to the west (Figure 2).

A steep escarpment rising approximately 100 feet just east of Lake Street marks an old shoreline of the lake. The natural beach at the toe of this encarpment has been built up and out into the lake by the addition of fill materials, primarily loose sand, some gravel, and some bulky debris (boulders and concrete rip-rap). The total width of the current lakeshore beyond the toe of the encarpment ranges from 400 to 700 feet in the vicinity of the site. The CV-Option property represents a total area of approximately 12 acres in a parcel approximately 1500 feet long by 350 feet wide. The ground surface in the property is almost flat (except for the berm around the old oil storage yard), sloping very gently toward the lake between elevations of 103 and 100 feet above Mean Sea Level (MSL).

The mean water level in Lake Champlain is 95.5 feet MSL, and the ordinary high-water elevation is 99.0 feet MSL. The average annual water level fluctuation is about 6 feet, peaking in April or May (New England River Basin Commission).

2.2 PHYSIOGRAPHIC SETTING, DRAINAGE, AND CLIMATE

Burlington is situated in the Champlain Lowland, a 12 to 15 mile wide north-south trending area of relatively low relief and isolated higher hills. The major river draining the Burlington area is the Winooski, which enters Lake Champlain approximately 2 miles north of the site. Surface drainage in the downtown area is directly to the lake through short steep runoff gullies and the network of municipal storm sewers (Stewart, 1973).

FIGURE 1

LOCATION MAP, CV-OPTION PROPERTY

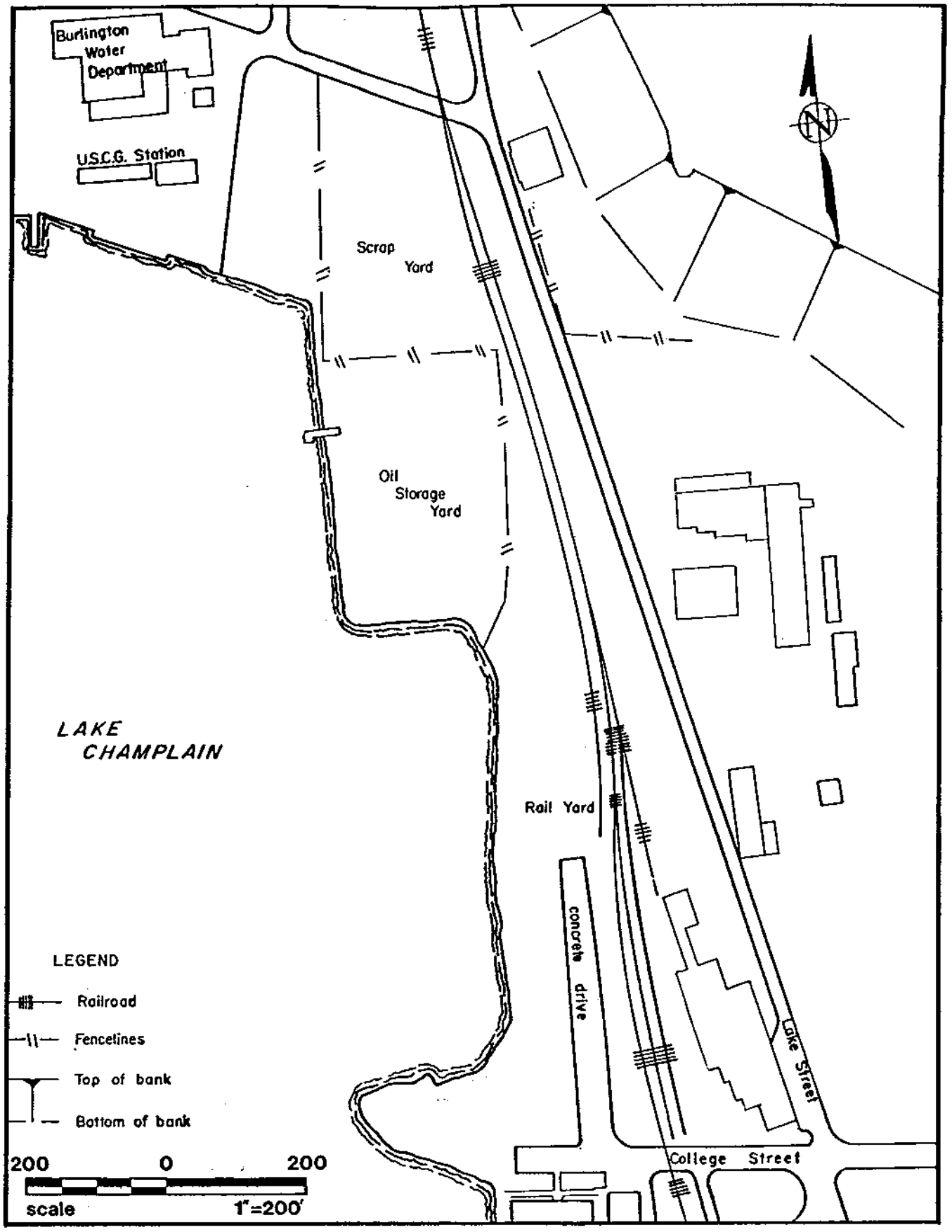


FIGURE 2

SITE MAP, CV-OPTION PROPERTY

The Champlain Valley has a cool, humid, continental climate with a mean annual air temperature of 42 degrees Fahrenheit; temperature range from a minimum average daily temperature of 7.6 degrees Fahrenheit in January to a maximum average daily temperature of 81.0 degrees Fahrenheit in July. Normal annual precipitation is approximately 32 inches and is fairly evenly distributed throughout the year, ranging from a low of 1.68 inches in February to a high of 3.72 inches in August (SCS, 1974). The severity of precipitation events is moderated by the presence of the Adirondack Mountains to the west and the Green Mountains to the east.

2.3 GEOLOGY

The Champlain Lowland is bounded on the west by Lake Champlain and on the east by the Green Mountains. The Lowland lies between the Champlain and Hinesburg Thrust Faults and is part of the Hinesburg Synclinorium. Bedrock beneath the City of Burlington consists of quartzites and dolomites striking approximately north-south and interlayered nearly horizontally along low-angle bedding planes and thrust faults.

The Champlain Lowland was subjected to severe erosion in Pre-Wisconsin stages of glaciation and again in the Late Wisconsin Stage. The earlier ice invasion covered the area with glacial till and later with lacustrine silts and clays, deposited by a glacial lake which formed as the ice sheet retreated. A subsequent re-advance of the ice moving south through the valley scoured away much of the previously deposited material.

Ice and sedimentary material deposited during the retreat of this last glacier blocked the Champlain Valley and formed a large lake, Lake Vermont. A thick layer of lacustrine silts and clays was subsequently deposited throughout the Champlain Valley Lowlands. As the continental glaciers melted, the waters of Lake Vermont were drained through the St. Lawrence Valley, but were later replaced by marine invasion of the Champlain Sea, which was caused by a short-lived worldwide rise in sea level. Shoreline deposits resulted from and are shaped by successive lacustrine and marine invasions and regressions and glacial re-advances. In the absence of the heavy mantle of glacial ice, post-glacial isostatic uplift produced the present elevations (SCS, 1974) and a widespread rise of historic shoreline areas above the current lake level.

The site is located on the current shore of Lake Champlain, in the transition zone between deltaic sands and lacustrine-marine silts and clays. The deltaic deposits, which underlie most of the Burlington downtown area, were formed in a thick wedge of fine to medium sands at the mouth of the historic Winooski River where it entered Lake Vermont/Champlain Sea. The marine and glacio-lacustrine silts were deposited off-shore in areas of open water, and represent the finer fractions of the glacial outwash sediments carried to the lake by the Winooski River and other tributary streams.

Off-shore sediments deposited in post-glacial (recent) times represent a mixture of man-made fill materials near shore in urban areas, and natural gravels, sands, silts, and organic-rich muds. Sediment distribution in the lake is controlled primarily by wave action and is well-developed in the main lake and larger bays, more haphazard in smaller shallow bays. Besides the direct deposition of man-made fill, including wood chips, sawdust and cinders in some areas, lake-bottom sediments have been impacted by localized enrichment with trace metals and/or organic nutrients related to discharges from on-shore sources (Hunt, 1971 and 1975).

2.4 SITE HISTORY

The CV-Option property can be divided into three principal areas on the basis of historic land use (Figure 2). The northernmost area, occupying approximately 3 acres, was the site of a scrap and metal salvage yard. The middle area (3.5 acres), mostly contained by berms 6 to 10 feet high, is an old bulk oil storage yard or tank farm. The southernmost area (5.5 acres) is a railyard in which the principal historic activity has been transfer and warehousing of goods transported by the railway, principally lumber, paper products, grain, and foods. A set of railroad tracks including the CV main track crosses the southern area and runs along the eastern edge of the middle and northern areas, parallel to Lake Street.

The land occupied by the CV-Option property was built out into the lake by filling in the 1850's and 1860's, and the first railroad tracks were installed at that time. From historical accounts, it appears that the land served primarily for the storage and transfer of lumber transported by rail and by barge on Lake Champlain during the latter half of the nineteenth century and the first quarter of the twentieth. The oil storage yard and the scrap yard both started up in the late 1920's or early 1930's, while the

warehousing activities in the railyard broadened to include other goods besides lumber. The oil storage yard was leased and operated by Shell Oil Company and various subsidiaries until 1979, when the tanks and other major structures were removed. Over its history, various liquid petroleum products were transported to and from the yard by rail, barge and truck. The scrap yard was operated by Queen City Iron and Metal primarily for metal salvage, and was also relocated in 1979. No other industrial or commercial activities have been conducted on the property since that time.

Other nearby land uses along the waterfront include the Naval Reserve Training Center to the south, and the U.S. Coast Guard Station to the north-northwest of the site, which includes a water lot (inner harbor) contained by a partially submerged jetty. The City of Burlington Water Treatment Plant is located just north of the Coast Guard Station. The water intake for this plant is located in Lake Champlain approximately one half-mile almost due west of the site, and the water is treated by coagulation/flocculation and sand filtration. Just north of the water treatment plant is a coal-powered electrical generating plant operated by Burlington Electric, with coal storage areas stretching along the waterfront north of the plant. The land east of Lake Street, at the toe of the escarpment, has been occupied by warehouses, and is currently being developed for commerical use. It is also used by the City of Burlington for storage/disposal of excess snow removed from city streets in winter. A variety of industries have occupied the downtown area above the escarpment east of the site, including a coal tar plant which was reportedly located on or near the site of the Radisson Hotel.

2.5 PREVIOUS INVESTIGATIONS

The property has been offered for sale by Central Vermont Railway for several years, and earlier studies have included subsurface investigations of the site or other nearby properties.

Test pits were apparently dug in the oil storage yard by Shell Oil or their agent at the time that the tanks were dismantled, but no records are available. Partial logs of test pits and on-shore and off-shore borings are available from a study conducted by Knight Consulting Engineers, Inc., in 1978 and 1979 for the developer that held the first option on the property.

The Alden Waterfront Corporation picked up the option in 1984 or 1985, and employed Aquatec, Inc., to perform various environmental studies at the site. The findings of these studies are summarized in Aquatec (1985). The Aquatec program included the following: determination of organic residue (or extractable weight using methylene chloride) in sediment from 6 on-shore sites and 13 off-shore sites; hydrocarbon identification analysis by gas chromatography (GC) scans at 8 on-shore sites and 4 off-shore sites; analysis of water from a seep for volatile organics, PCB's and pesticides; a full U.S. EPA Hazardous Substance List analysis of one off-shore sediment sample (including volatile organics, semi-volatiles, pesticides and PCB's as well as metals, nitrogen series compounds, phosphate, COD, oil and grease and pH); and analysis of pesticides and PCB's in elutriate from three sediment samples taken from near-shore, lake-bottom sampling sites. In general, significant concentrations of organic residues (ranging from background levels of 15-21 mg/Kg up to 51,000 mg/Kg) were found in the top 5 feet at on-shore sampling sites (concentrated in the bermed portion of the oil storage yard and the eastern part of the scrap yard) and randomly at some of the off-shore sites. GC scans identified the presence of fuels ranging from aromatic kerosene to No. 6 fuel oil in the tank farm area, while organic residues in the scrapyard area were generally of higher molecular weight. No pesticides or PCB's were detected in any of the elutriate samples. Three pesticides, traces of toluene and carbon disulfide, and measurable concentrations of selected semi-volatile compounds representing the heavier components of fuel were found in the near-shore sediment sample.

SECTION 3

ON-SHORE INVESTIGATION

The purpose of the on-shore hydrogeologic investigation was to evaluate subsurface conditions beneath the site, specifically the occurrence and flow direction(s) of groundwater and the presence of contamination, if any, in soils and groundwater. This was accomplished through a drilling program involving exploratory borings, soil sampling, installation of permanent monitor wells, field surveys and groundwater sampling. The findings of WESTON's field investigation have been supplemented with data from earlier investigations, where appropriate, in the evaluation of the site.

3.1 FIELD METHODS

This section describes the field methods used in developing data for the investigation of on-shore hydrogeologic conditions, including the collection of soil and water samples for laboratory analysis. The field investigation was begun in December 1985 and completed in February 1986. Table 1 summarizes the schedule of field work for the on-shore investigation.

3.1.1 Drilling, Soil Sampling and Well Construction

Drilling was conducted at five locations on the property between December 16 and 24, 1985. Paired monitor wells (deep and shallow) were installed at two of the locations, and single monitor wells (shallow) were installed at the other three; a total of seven monitor wells were installed at the locations shown in Figure 3. Monitor wells MW-1 and 1A were drilled in a presumed upgradient direction from the site (to the east), beyond the CV property boundary. Wells MW-2, 4 and 4A were drilled inside the bermed area of the former oil storage yard, well MW-3 was drilled in the former scrapyard area, and MW-5 in the railyard area south of the oil storage yard. Drilling, soil sampling, well construction and well development were performed by Adams Engineering of Underhill, Vermont, using a tractor-mounted hydraulic rotary rig and 3.75-inch ID, 6-inch OD hollow stem augers.

TABLE 1

SUMMARY OF FIELD WORK SCHEDULE, ON-SHORE INVESTIGATION
CV-OPTION PROPERTY

16-24 DEC 1985	Drilling, soil sampling, monitor well installation and development
29 JAN 1986	Monitor well slug testing
30 JAN 1986	Groundwater sampling, all monitor wells
31 JAN 1986	Top of casing elevation survey
26 FEB 1986	Resampling of monitor wells MW-2 and MW-4

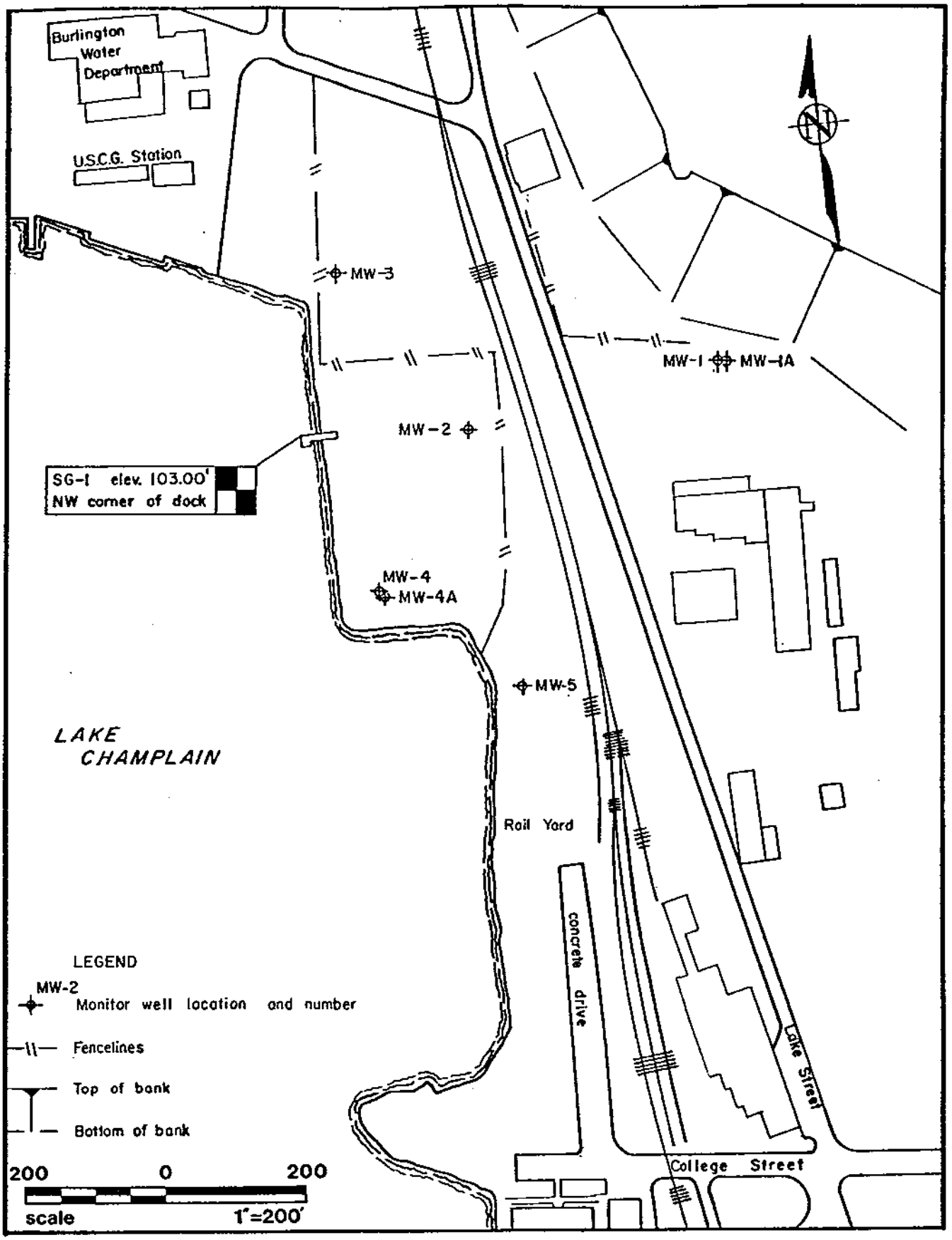


FIGURE 3

MONITOR WELL LOCATION MAP, CV-OPTION PROPERTY

Soil samples were collected at each of the five drilling locations for lithologic classification. Samples were collected continuously above the water table and at five-foot intervals thereafter. At locations where paired monitor wells were to be installed (MW-1/1A and MW-4/4A), continuous samples were collected only in the first and deepest of the two borings. The second boring was drilled approximately 10 feet away from the first, and generally was not sampled as intensively. Samples were collected using a hammer to drive a two-foot long split spoon sampler driven 1.5 to 2.0 feet ahead of the auger flights. The length of sample recovered varied depending on soil conditions. Heaving and running sands were encountered below the water table in most boreholes, and the recovery of representative soil samples from depth was therefore difficult in some cases. Complete lithologic logs are provided in Appendix A-1; blow counts are not reported because the hammer and length-of-fall used did not match the specifications of the Standard Penetration Test (ASTM D-1586).

Duplicate soil samples were collected from each split spoon. One half of each soil sample was screened shortly after collection by warming the sample to room temperature, agitating the sample inside a glass container, and measuring the total volatile organics concentration (TVO) in the atmosphere inside the containers using an HNu PI-101 portable photoionization detection unit. None of the samples exhibited a measurable TVO. In addition, TVO was monitored intermittently during drilling, inside the auger flights at each borehole. The only borehole in which a measurable TVO was reported was MW-2, at a concentration of 2 to 3 ppm above background.

The two uppermost samples from each borehole were retained for laboratory analysis. Based on shallow water table conditions encountered at this site, these samples can be considered representative for the unsaturated soil zone and the top of the saturated zone (including the capillary fringe). The capillary fringe, a saturated zone immediately above the water table, is the zone where accumulation of oily free product would be most likely to occur, if any were present. Staining of soil above and near the water table with a dark oil-like substance was observed at two drilling locations, MW-2 and MW-4/4A, and stained soils were included in the laboratory samples from these locations. A total of ten soil samples were collected for analysis from the five drilling locations, but one sample container from MW-1 was broken in shipping, so that only nine samples were analyzed. All soil samples were analyzed for the volatile organic compounds on the U.S. EPA Hazardous Substance List (VOC) by U.S. EPA method 624. Full laboratory reports for soils analyses are provided in Appendix A-3, and the results are discussed further in Section 3.2.2.

TABLE 2

SUMMARY OF MONITOR WELL CONSTRUCTION DETAILS,
CV-OPTION PROPERTY

WELL NUMBER	ELEV. TOP OF STL (FT)	ELEV. TOP OF PVC (FT)	GROUND SURFACE ELEV. (FT)	TOTAL DEPTH BGS (FT)	TOP OF SCREEN BGS (FT)	SANDPACK INTERVAL BGS (FT)
MW - 1	115.53	115.52	113.99	13.7	3.7	2-14
MW -1A	116.61	116.48	114.50	34.0	24.0	23-34
MW - 2	104.49	103.93	101.78	18.2	3.2	2-19
MW - 3	105.41	105.36	103.21	18.7	3.7	2-19
MW - 4	101.91	101.66	100.52	18.3	3.3	3-19
MW -4A	102.23	102.10	100.17	51.2	41.2	40-52
MW - 5	102.25	102.03	101.06	18.4	3.4	2-18

NOTE: All elevations relative to Mean Sea Level (MSL), tied to a benchmark at Burlington Water Treatment Plant

All monitor wells were constructed of 2-inch ID flush-threaded PVC pipe and factory-slotted (0.020-inch slot) screen. In the five shallow wells, the screen was 10 or 15 feet long, starting as close to ground surface as practical and finished at a total depth between 13 and 19 feet. The screen was packed with a combination of natural sand and imported Ottawa-grade quartz sand, and a bentonite pellet seal was emplaced in the annulus over the sand pack.

Each of the monitor wells was fitted with a locking steel protective casing set in a concrete plug in the top 1 to 2 feet of the borehole, and a locking cap. The shallow wells were designed so that the screen would intersect the top of the water table if possible. Subsequent water level measurements show that this was accomplished in all wells except MW-2, where the water table is approximately 2.5 feet below ground surface. The two deeper wells, MW-1A and MW-4A, were finished with 10 feet of screen each, set at total depths of 34 and 51 feet respectively. The screens were packed in sand to approximately 1 foot above the top of screen, and the annulus above this level was sealed with bentonite. Subsequent water level measurements indicate that, by this means, hydraulic separation was achieved between the two wells in each pair, so that they can be assumed to be monitoring separate zones vertically in the subsurface. Additional well construction details are included in the well logs (Appendix A-1), and Table 2 is a summary of monitor well construction details.

All monitor wells were developed by the driller within 1 to 2 days of completion, using a compressed air-lift system to surge the well and to pump it at a low rate in intermittent pulses. In this manner, excess sediment was evacuated from the well bottom and good hydraulic connection was established between the screened interval in each well and the section of aquifer being monitored.

3.1.2 Monitor Well Slug Testing

The hydraulic properties of the aquifer in the vicinity of each monitor well were tested by means of "slug tests". A slug test is a short-duration test in which a water level displacement of known magnitude is created in the well and the subsequent dissipation of the water level differential between maximum displacement and static level (or residual drawdown) is monitored. At the CV-Option property site, a solid slug consisting of a six-foot long, one-inch diameter weighted and sealed PVC pipe was used to cause a water level displacement, and subsequent water level changes were monitored and recorded using a pressure-sensitive transducer immersed in the well and connected to an In-Situ SE 1000B data logger.

All monitor wells were tested on 29 January 1986. In general, the tests were run twice in each well, once in the falling head mode (water level decline after slug insertion) and once in the rising head mode (water level recovery after slug extraction). Due to the proximity of the static water level in well MW-4A to the top of casing, only a rising head test could be run in this well. Air temperatures dropped during the testing period, causing the equipment to fail before meaningful data could be collected from the last well tested, MW-3. All available slug test data have been compiled in Appendix A-2.

Computer methods were used to generate semi-logarithmic data plots (Appendix A-2) for each of the tests. Two methods were used to estimate values of hydraulic conductivity from the plotted data: Bouwer and Rice (1976) and U.S. Dept. of the Navy (1974, in Cedergren, 1977). Calculation summaries are provided in Appendix A-2, and the results are summarized in Table 3. In general, the results show good reproducibility between the rising head and falling head tests in each well. Results yielded from the Bouwer and Rice (1976) method were consistently higher, but within the same order of magnitude, as the results from the U.S. Navy (1974) method. An average value of hydraulic conductivity has been calculated for each well from the available set of results for that well.

3.1.3 Water Level Survey

Water levels were measured in each well at the end of the drilling period (24 December 1985), and again on 29 and 30 January 1986. The topographic elevations of the ground surface and top of well casings at each well were surveyed on 31 January 1986, using a Dietzgen transit with an accuracy of $\pm$0.05 feet. All elevations were tied to a catch basin at the Burlington Water Treatment Plant adjacent to the property. Elevations relative to Mean Sea Level (MSL) were calculated from the catch basin elevation provided by the Burlington Water Department. A measuring point for the water level in Lake Champlain was established on the dock (Figure 3), and the elevation of the top of the ice in the lake was surveyed at 95.38 feet MSL. Mean lake water elevation in Lake Champlain recorded by the USGS in Burlington harbor on the same date (31 January 1986) was 95.79 feet MSL.

Results of the groundwater level survey are summarized in Table 4.

TABLE 3

SUMMARY OF MONITOR WELL SLUG TEST RESULTS
JANUARY 1986
CV-OPTION PROPERTY

MONITOR WELL NUMBER	TYPE OF TEST (1)	HYDRAULIC CONDUCTIVITY (FT/DAY) BOUWER AND RICE (1976) METHOD	U.S. NAVY METHOD	AVERAGE FOR THE WELL
MW-1	FH	1.80	1.04	2.2
	RH	3.73	2.15	
MW-1A	FH	22.3	12.8	19
	RH	25.4	14.6	
MW-2	FH	11.4	6.45	11
	RH	17.1	9.67	
MW-3	NO DATA AVAILABLE			
MW-4	FH	14.4	8.15	10
	RH	10.8	6.11	
MW-4A	RH	0.26	0.15	0.21
MW-5	FH	4.65	2.62	3.6
	RH	4.65	2.62	

NOTES: (1) FH = falling head slug test
RH = rising head slug test

(2) No useable data could be obtained from well MW-3 due to equipment failure

TABLE 4

SUMMARY OF GROUNDWATER LEVEL SURVEY DATA,
DECEMBER 1985 - JANUARY 1986
CV-OPTION PROPERTY

WELL NUMBER	MEAS. PT. ELEV. (FT)	DEPTH TO WATER BELOW MEAS. PT. (FT) 12/24/85	01/29/86	01/30/86	GROUNDWATER LEVEL ELEVATION (FT) 12/24/85	01/29/86	01/30/86
MW - 1	115.53	6.05	6.26	6.27	109.48	109.27	109.26
MW -1A	116.61	6.68	7.03	6.97	109.93	109.58	109.64
MW - 2	104.49	4.86	4.75	4.79	99.63	99.74	99.7
MW - 3	105.41	7.71	7.69	7.66	97.7	97.72	97.75
MW - 4	101.91	6.33	6.57	6.22	95.58	95.34	95.69
MW -4A	102.23	0.79	approx 1.1 (frozen)		101.44	approx 101.1 (frozen)	
MW - 5	102.25	5.07	5.17	5.07	97.18	97.08	97.18

NOTE: All elevations, relative to mean sea level (MSL), are tied to bench mark at the Burlington Water Treatment Plant

Elevation of Lake Champlain on 01/29/86 approximately 95 feet MSL (surface frozen)

3.1.4 Groundwater Sampling

All seven monitor wells were sampled on 30 January 1986. Prior to sampling, each well was checked for the presence of oil-like free product on the water table using a clear acrylic bailer; none was detected in any of the wells. Each well was subsequently purged using a Johnson-Keck stainless-steel battery-powered submersible pump to evacuate a minimum of three well volumes. Upon completion of purging, the pump was withdrawn from the well and a sample was collected using a teflon bailer. Both pump and bailer were decontaminated between each well using a methanol solution followed by a rinse with commercially-available distilled water. Two extra samples were collected for quality assurance (QA) purposes: a field duplicate of groundwater from MW-3, labelled MW-6; and a field blank labelled MW-7 of commercially-available distilled water rinsed through the decontaminated bailer between sampling of wells MW-4A and MW-4.

Several field parameters were monitored in the discharge water during purging: temperature, specific conductance, pH, and total volatile organics (TVO) measured with an HNu on agitated water samples. The only sample in which measurable TVO was detected was MW-2, at a concentration of 8.2 ppm in the headspace of an agitated sample. Field water quality data are summarized in Table 5.

All samples were analyzed by the WESTON laboratory in Lionville, Pennsylvania, following U.S. EPA Contract Laboratory Program (CLP) protocols. All samples including the two QA samples were analyzed for the VOC on the U.S. EPA Hazardous Substance List by U.S. EPA method 624. In addition, full priority pollutant analyses (including semi-volatiles, pesticides and PCB's, metals, phenol and cyanide), and an oil and grease analysis, were run on samples from MW-2 and MW-4, the two wells exhibiting evidence of contamination during drilling (soil staining, odor, and/or detectable TVO).

After the initial sampling round, it was determined that the cyanide and oil and grease samples from MW-2 and MW-4 had not been preserved at the time of collection. Therefore, these two wells were re-sampled on 26 February 1986, following similar procedures as described above. The oil and grease sample was collected from the top of the water column prior to purging, and the cyanide sample was collected after purging three well volumes from the well.

Full laboratory reports are provided in Appendix A-4. Groundwater quality results are discussed in detail in Section 3.2.3.

TABLE 5

SUMMARY OF FIELD-TESTED WATER QUALITY PARAMETERS,
JANUARY 1986
CV-OPTION PROPERTY

WELL NO.	TOTAL VOLUME PURGED (gal)	TEMP-ERATURE (oC)	ELECTRICAL CONDUCTIVITY (umho/cm)	pH
MW-1	1	6.5	900	6.4
	5	7.0	950	6.4
	10	9.5	950	7.5
MW-1A	1	9.0	700	6.4
	8	10.0	800	6.2
	16	9.0	550	7.1
	20	9.5	750	6.5
MW-2	1	7.0	1200	7.1
	10	7.0	1200	7.1
	12	7.0	750	6.7
MW-3	1	8.5	700	6.1
	8	7.0	700	6.3
	12	8.0	700	6.5
MW-4	1	7.0	460	6.2
	6	7.0	460	6.9
	15	8.0	550	7.1
MW-4A	1	8.0	320	7.8
	10	8.0	355	7.5
	15	8.0	355	7.2
MW-5	1	7.5	460	6.2
	8	7.0	490	6.2
	11	7.0	550	6.4

3.2 RESULTS

3.2.1 Site Hydrogeology

The information on subsurface geology and groundwater conditions obtained in the field investigation was used to expand on the data base available from previous studies, in order to develop a good conceptual understanding of the occurrence and migration of groundwater beneath the site.

Figure 4 shows the location of two diagrammatic cross-sections across the site, developed from the well logs in Appendix A supplemented with geologic information available from previous studies. The cross-sections, shown in Figures 5 and 6, give a generalized picture of subsurface conditions in a direction approximately perpendicular to (cross-section A-A') and parallel to (cross-section B-B') the shoreline. As shown in the cross-sections, sediments in the upper 15 to 20 feet consist primarily of dark grey fine sand and silt underlain by grey fine to medium sand. Moving towards the lakeshore, the grey sands and silts are replaced with coarser material, primarily loose brown sand and gravel. This gradation is thought to represent successive stages of filling of the property out into the lake. Fill materials in the area of the oil storage yard are underlain at a depth of 15 to 22 feet by a relatively dense grey silt with clay lenses, which appears to represent natural lake bottom sediments. This silt was confirmed in drilling locations MW-2, MW-4/4A and MW-5, but not at the MW-3 location. The underlying natural sediment appears to grade into a coarser facies moving inland: at the upgradient drilling location (MW-1/1A), grey and brown medium sands were encountered below a depth of 20 feet, and drilling had to be halted at 45 feet due to a running sand condition.

The generalized geologic classifications presented in Figures 5 and 6 are supported by the slug test results summarized in Table 3. In general, the hydraulic conductivity (or permeability) of sediments increases with increasing grain size and degree of sorting; a clean medium sand will have a hydraulic conductivity one to three orders of magnitude higher than a silt or mixture of fine sand and silt. Monitor well MW-1A, the deep well in the upgradient pair, was finished in medium sand between 24 and 34 feet and tested out with the highest hydraulic conductivity (19 feet per day) of any of the monitor wells. This is an order of magnitude higher than the result (2.2 feet per day) for MW-1, which was finished in fine-to-medium sand approximately 20 feet higher. Monitor wells MW-2, MW-4 and MW-5 were finished in medium and fine to medium sands in the interval of 3 to 18 feet

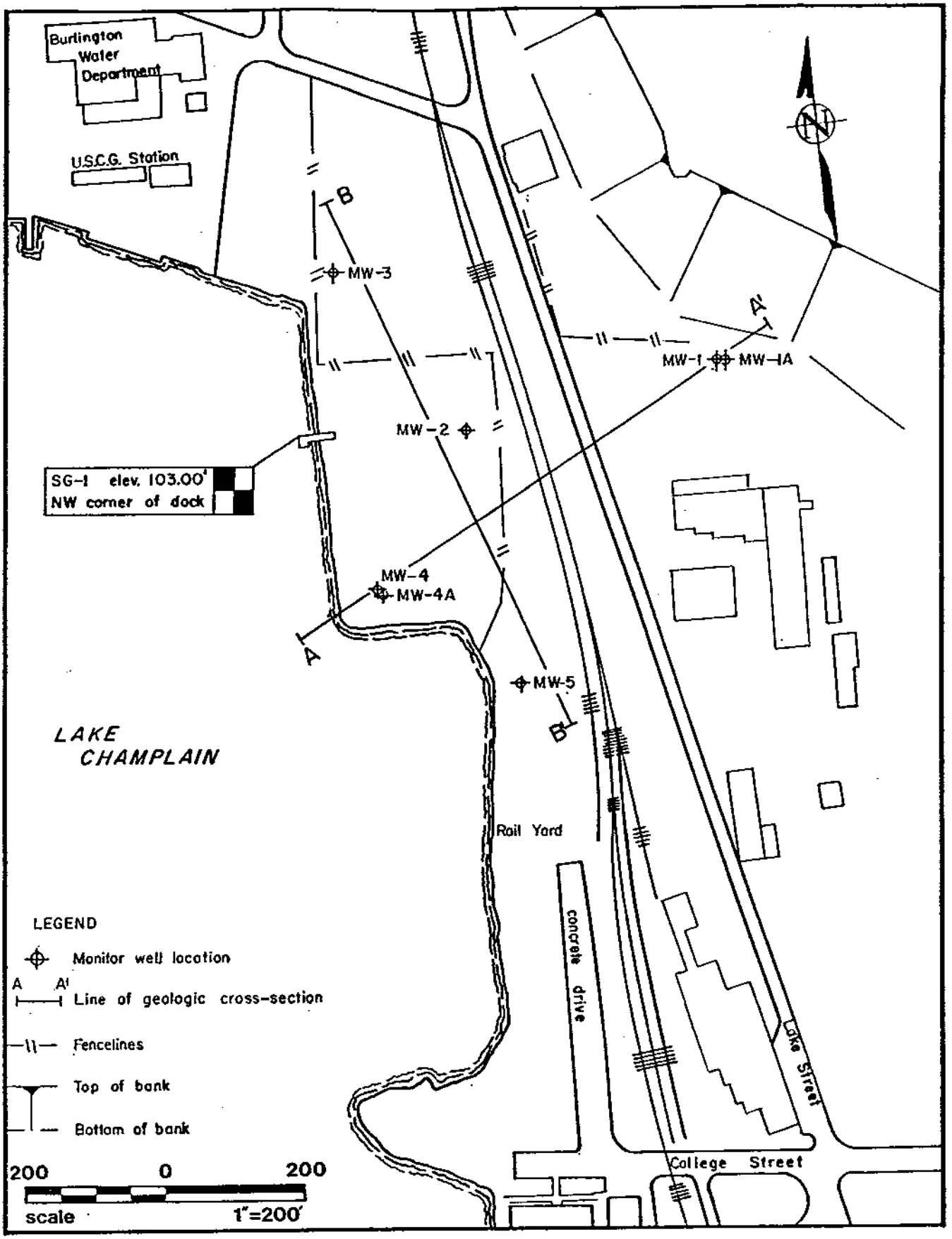


FIGURE 4

LOCATION MAP FOR GEOLOGIC CROSS-SECTIONS, CV-OPTION PROPERTY

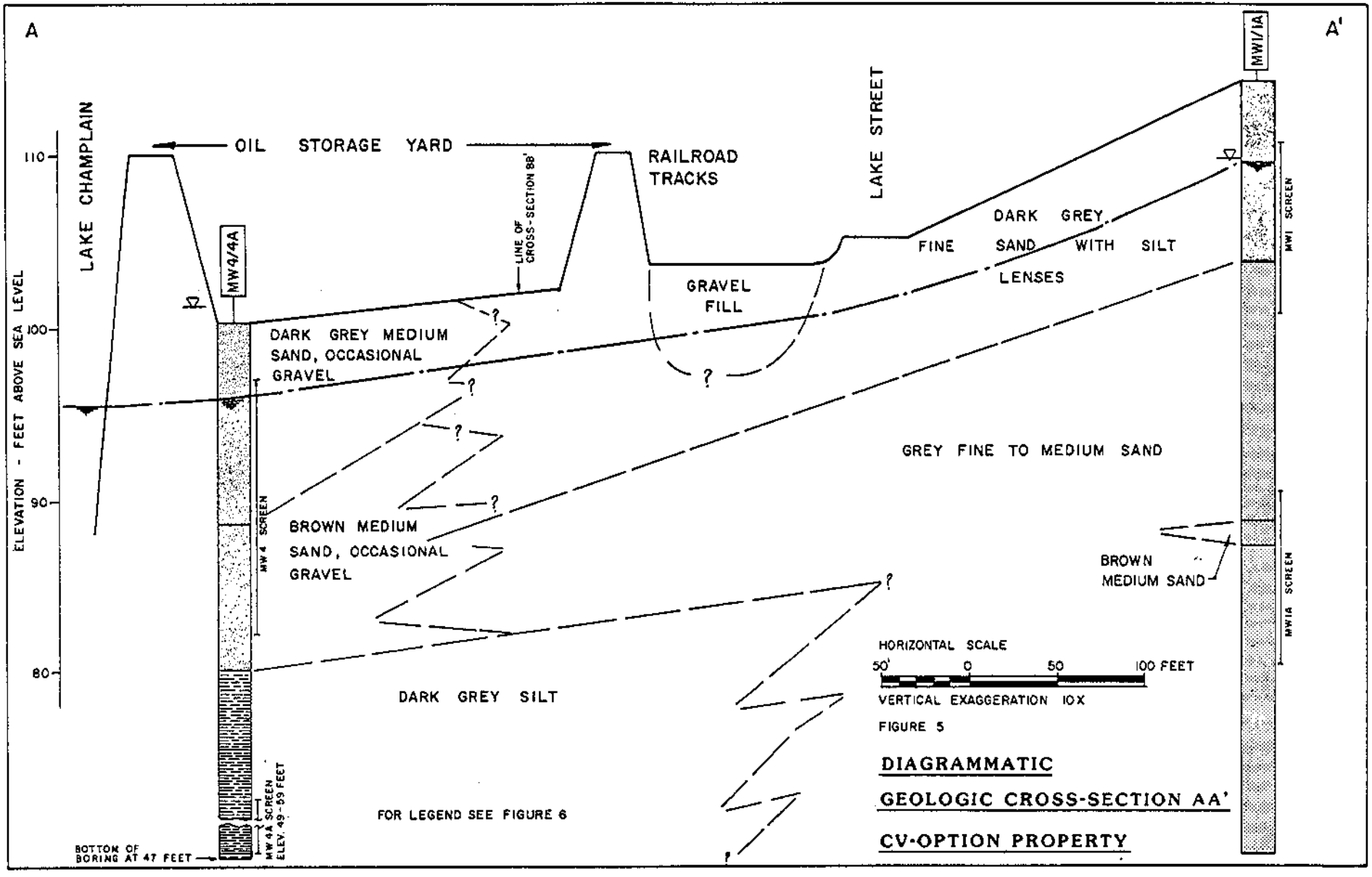


FIGURE 5

DIAGRAMMATIC GEOLOGIC CROSS-SECTION AA'

CV-OPTION PROPERTY

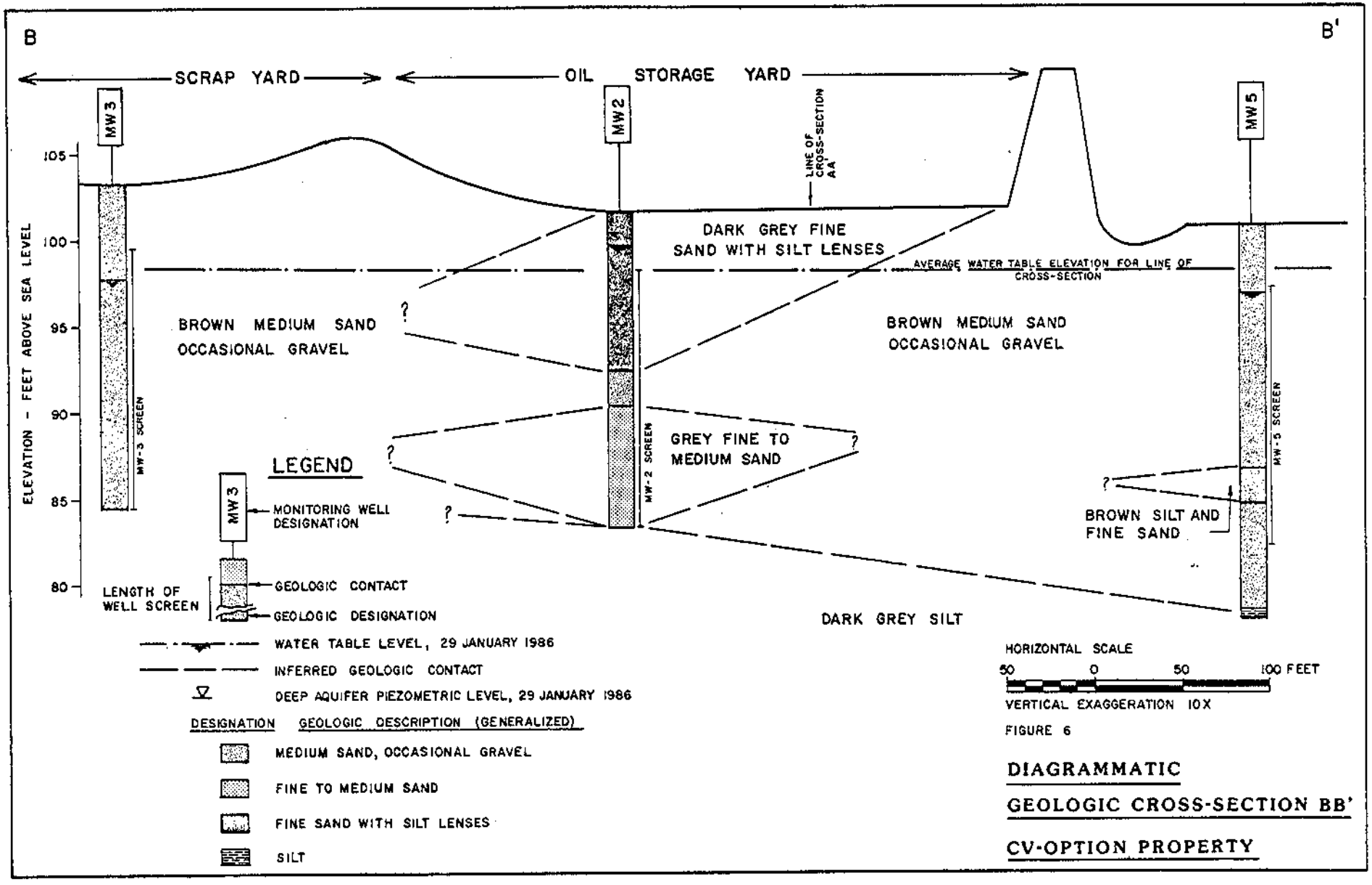


FIGURE 6

DIAGRAMMATIC

GEOLOGIC CROSS-SECTION BB'

CV-OPTION PROPERTY

below ground surface, and the hydraulic conductivities calculated for these wells ranged from 3.6 to 11 feet per day. The lowest result for hydraulic conductivity (0.21 feet/day) was obtained in MW-4A, the deeper downgradient well finished and sealed in silt between 41 and 51 feet. This finding indicates that the natural silts occurring at depth beneath the oil storage yard have a hydraulic conductivity at least one order of magnitude lower than the overlying, coarser fill sediments.

The groundwater level data listed in Table 4 have been used to develop the groundwater level map in Figure 7, and are also presented schematically in the cross-sections in Figures 5 and 6. Only the shallow wells screened at the water table have been used as control points for the water table elevation. This is because hydraulic head increases with depth in the aquifer beneath the site, so that the deeper a well is finished, the higher the water level in that well will rise above the water table. This is demonstrated in both locations where deep wells were paired with shallow wells and sealed at depth in the aquifer. A head difference (corresponding to the difference between water level elevations in the two wells) of 0.31 to 0.45 feet was observed at location MW1/1A; a head difference of over 4 feet was observed at location MW-4/4A (Table 4). It can be concluded that there is an upward hydraulic gradient across the property which increases toward the lake. This indicates that the whole property is in a groundwater discharge zone, and that groundwater flows not only laterally toward the lake, but upwards from deeper strata into the shallow sediments monitored by the five shallow wells. The overall effect on potential groundwater contamination, if any was present, would be to restrict it to shallow flow zones, to prevent its migration to deeper portions of the aquifer, and to increasingly dilute concentrations with the addition of groundwater from below as lateral flow occurs toward the lake.

The direction of lateral flow can be deduced from the water table map in Figure 7. It can be assumed that groundwater will flow approximately perpendicular to the groundwater contour lines, in the direction shown by the flow lines. The predominant lateral flow direction is west-southwest, from the escarpment toward the harbor.

An estimate of the volume of groundwater flow in the shallow flow zone can be made by applying Darcy's equation to the flow net illustrated in Figure 7. In a flow net analysis, the flow through each flow tube (the area contained between two flow

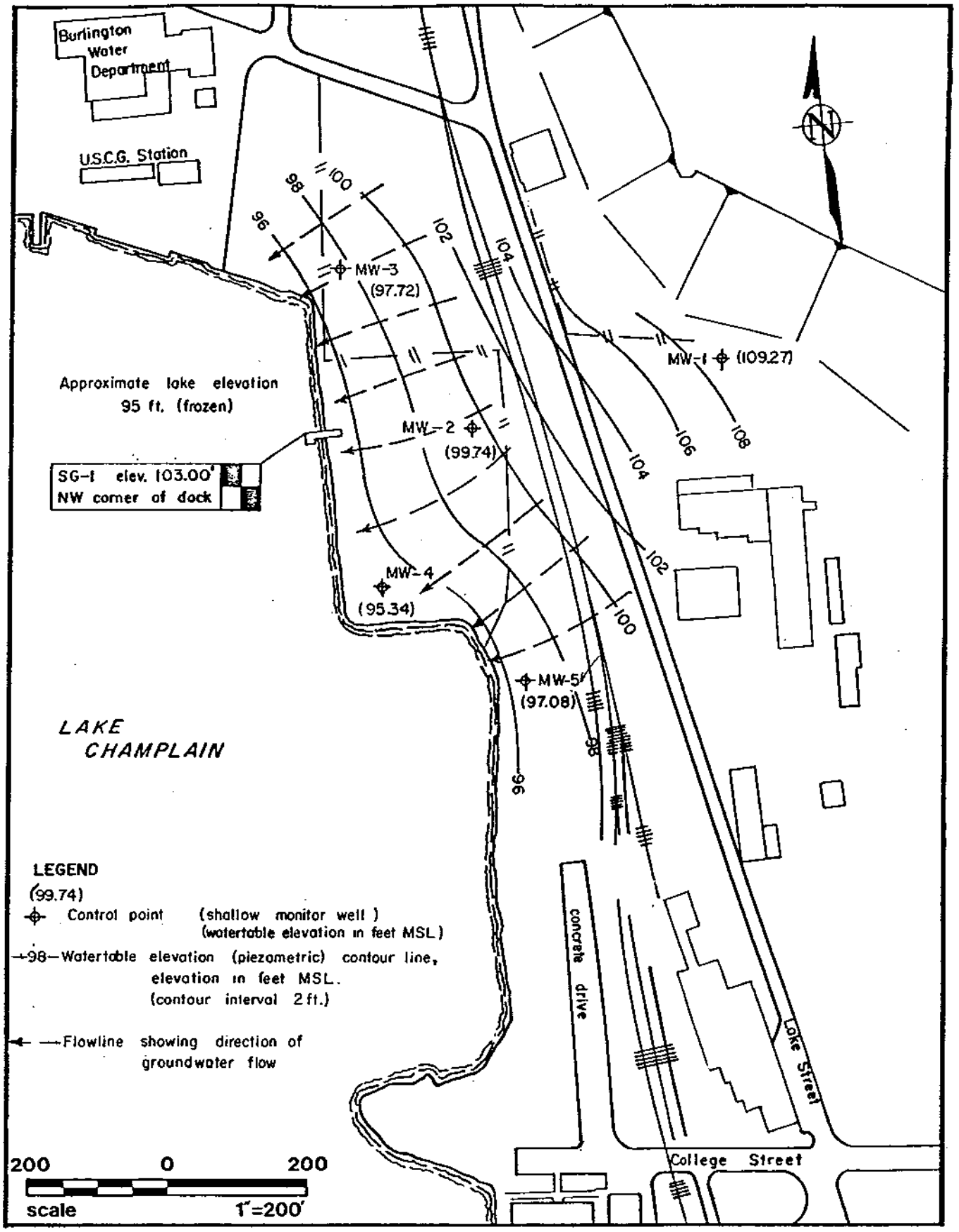


FIGURE 7

WATER TABLE MAP AND FLOWNET, 29 JANUARY 1986, CV-OPTION PROPERTY

lines) can be considered equal if the flow lines are drawn so that an approximately square grid is maintained. In the case of a square flow net, the flow through any one flow tube is calculated as:

$$Q = Kb\,\Delta h$$

where Q = volumetric flow rate (ft^3/day or gpd)
K = hydraulic conductivity of the aquifer (ft/day)
b = saturated thickness of aquifer (ft)
Δh = hydraulic head differential between equipotential (or water level) contour lines (ft)

The zone of interest is the shallow flow zone above the silt layer because it is in this zone that contamination will occur and migrate if it is present in groundwater. A reasonable estimate for the saturated thickness (b) of this zone, based on the cross-sections in Figures 5 and 6, is 20 feet. A reasonable estimate of hydraulic conductivity (K) in this zone is 6 feet per day (the average for wells MW-2, MW-4 and MW-5). The hydraulic head difference between contour lines in the flow net in Figure 7 is 2 feet. Therefore, a reasonable estimate of flow through each flow tube in the top 20 feet of saturation would be 240 ft^3/day, or 1800 gallons per day (gpd). The total shallow groundwater flow into the lake would be 9000 gpd from beneath the oil storage yard (5 flow tubes) and 5400 gpd from beneath the scrapyard (approximately 3 flow tubes).

A portion of the laterally-flowing groundwater in the top 20 feet of saturation originates from upgradient areas east of the property, and a portion is contributed from lower flow zones in the aquifer. A third portion originates on-site from direct recharge of precipitation. It is this portion that will carry soil contaminants from the unsaturated zone down to the zone of saturation, where they can move laterally toward the lake. An estimate of the volume of water recharged on the site can be derived from a rough water budget for the site. The combined acreage of the oil storage yard and scrapyard is 6.5 acres, and the annual precipitation averages 32 inches per year. This precipitation represents an annual volume of 755,040 ft^3 over the property. The annual surface runoff from this area is estimated at 12 percent of precipitation, based on the relatively flat topography over the whole area, the presence of a berm around a portion of the area, and relatively low rainfall

intensities in the region. Annual evapotranspiration is estimated at 70 percent of precipitation (approximately 22 inches). Groundwater recharge is calculated as the remainder after surface runoff and evapotranspiration have been subtracted from precipitation. In this case, recharge is estimated at 17 percent of 755,040 ft3 per year, or 128,400 ft3 per year. This volume corresponds to an average recharge rate of 350 ft3/day, or 2600 gpd, over the combined area of the oil storage yard and scrapyard. If the lateral groundwater flow rate beneath the same area is 14,400 gpd (see above), approximately 18 percent is contributed from direct recharge of precipitation.

These flow calculations indicate that relatively large volumes of water pass through the soils beneath the site as recharge from precipitation, representing a high potential for flushing and dilution of contaminants present in these soils. The potential for additional dilution in the upper portion of the saturated flow system is also significant, since the total volume of water moving laterally through the top twenty feet of saturation is five to six times the volume of water recharged.

3.2.2 Analytical Results for Soils

As described in Section 3.1.1, nine soil samples collected during drilling were submitted for laboratory analysis. The samples were collected from 3 to 7 feet below ground surface, one from location MW-1/1A, two each from the other four drilling locations. The samples from MW-2 and MW-4/4A were the only ones that exhibited noticeable staining and petroleum-like odors in the field.

All nine samples were analyzed for volatile organic compounds, and the results are summarized in Table 6. Only the compounds actually detected in at least one sample are reported in Table 6. Full laboratory reports are available in Appendix A-3. Of the compounds detected, four (methylene chloride, 2-butanone, acetone and chloroform) can be assumed to be present as a result of laboratory contamination. Only five parameters were found at concentrations above detection limit, and only in samples from locations MW-2 and MW-4/4A; these compounds were chlorobenzene, ethylbenzene, 4-methyl- 2-pentanone, 2-hexanone and total xylenes. All of these compounds are components of petroleum-derived fuels, such as would have been stored in the oil storage yard. Concentrations of total xylenes ranged from 680 to 11,000 ug/kg at location MW-2, and from 3,300 to 6,700 ug/l at location MW-4/4A. Sample S-1 from MW-2 exhibited the highest total concentrations of VOC, on the order of 14,700

TABLE 6

SUMMARY OF VOC CONCENTRATIONS IN SOILS, CV-OPTION PROPERTY

BORING LOCATION NUMBER:	MW - 1	MW - 2		MW - 3		MW - 4		MW - 5	
SAMPLE NUMBER:	S - 1	S - 1	S - 2	S - 1	S - 2	S - 1	S - 2	S - 1	S - 2
SAMPLE DEPTH BELOW GROUND SURFACE (FEET):	3-5	3-5	5-7	3-5	5-7	3-5	5-7	3-5	5-7
DETECTION LIMIT (1):	12	160	120	12	10	550	540	11	11
VOLATILE ORGANIC COMPOUND (2):									
METHYLENE CHLORIDE	J	-	-	19	-	J	J	J	J
TRICHLOROETHYLENE	J	-	-	-	-	-	-	-	-
2-BUTANONE	J	J	J	J	J	-	-	-	-
TETRACHLOROETHYLENE	-	J	-	-	-	-	-	-	-
TOLUENE	-	J	-	-	-	J	J	-	-
CHLOROBENZENE	-	360	J	-	-	J	640	-	-
ETHYLBENZENE	-	580	J	-	-	780	2,400	-	-
ACETONE	-	J	J	-	-	J	-	-	-
4-METHYL-2-PENTANONE	-	270	J	-	-	-	J	-	-
2-HEXANONE	-	2,500	-	-	-	-	-	-	-
TOTAL XYLENES	-	11,000	680	-	-	3,300	6,700	-	-
STYRENE	-	-	J	-	-	-	-	-	-
CHLOROFORM	-	-	-	J	-	-	-	-	-
ALL OTHERS	-	-	-	-	-	-	-	-	-

NOTES:

All concentrations in ug/Kg
- = not detected
J = present at less than detection limit

(1) detection limit varies by sample according to total VOC concentration and required dilution for analysis
(2) includes 35 VOC on the U.S. EPA Hazardous Substance List

ug/kg, or 15 ppm. Total VOC concentrations at MW-4/4A ranged from 4,100 to 9,500 ug/kg (4-10 ppm).

Possible interference from "non-target hydrocarbons" was noted in both analytical reports for the MW-4/4A samples. "Non-target compounds" are compounds which are not listed in the U.S. EPA Hazardous Substance List (HSL). Because the analysis is not calibrated for these compounds, their identification and quantification is tentative only. A review of the full analysis by WESTON's laboratory indicates that the non-target compounds in these soils consist of cyclo-paraffins (also components of fuels) and other unknown hydrocarbons not included on the HSL.

3.2.3 Groundwater Quality

Nine groundwater samples (including two quality assurance samples) were collected and submitted for laboratory analysis of volatile organic compounds (VOC), as described in Section 3.1.4. Two groundwater samples, from MW-2 and MW-4, were also submitted for the analysis of semi-volatile (base-neutral and acid extractable) compounds, PCB's and pesticides, phenol, cyanide, selected metals, and oil and grease.

Field-measured water quality parameters (pH, electrical conductivity and temperature) are summarized above in Table 5. Groundwater temperatures at the time of sampling ranged from 6.5 to 10° Centigrade. Values of pH ranged from 6.2 to 7.8, and appeared to be slightly higher in deep well MW-4A than in the other monitor wells. Electrical conductivity ranged from 320 to 1200 umhos/cm, and was highest in the most upgradient wells, MW-1, MW-1A and MW-2. This finding may be related to contamination from road salt, since the field next to MW-1/1A and upgradient from MW-2 is used for snow storage/disposal by the city in winter.

The results of the VOC analyses are summarized in Table 7. Only the compounds actually detected in at least one sample are reported in Table 7. Full laboratory reports are provided in Appendix A-4. Three of the compounds detected can be assumed to be present as a result of laboratory contamination: methylene chloride, chloroform, and acetone. Of the remaining compounds, the only two detected at concentrations above the detection limit were total xylenes and ethylbenzene, and only in MW-2. This same boring also yielded the soil sample with the highest levels of

TABLE 7

SUMMARY OF VOC CONCENTRATIONS IN GROUNDWATER, CV-OPTION PROPERTY

VOLATILE ORGANIC COMPOUND (1)	DETECTION LIMIT	MW-1	MW-1A	MW-2	MW-2 (R)	MW-3	MW-3 (FD)	MW-4	MW-4A	MW-5	MW-7 (FB)
METHYLENE CHLORIDE	10	J	J	J	J	J	J	J	J	J	J
CHLOROFORM	10	12	J	-	-	-	-	-	-	J	-
ACETONE	10	12	-	-	-	-	-	-	-	-	-
BENZENE	10	-	-	J	J	-	-	-	-	-	-
TOLUENE	10	-	-	J	J	-	-	-	-	-	-
ETHYLBENZENE	10	-	-	16	16	-	-	-	-	-	-
TOTAL XYLENES	10	-	-	110	110	-	-	J	-	-	-
CARBON DISULFIDE	10	-	-	-	-	-	-	-	J	-	-
ALL OTHERS	10	-	-	-	-	-	-	-	-	-	-

NOTES:

All concentrations reported in ug/L
- = not detected
J = present at less than detection limit
(R) laboratory replicate analysis
(FD) field duplicate
(FB) field blank

(1) includes 35 VOC on the U.S. EPA Hazardous Substance List

VOC, which included the two compounds detected in groundwater. Total VOC concentrations in groundwater at MW-2 were approximately 120 ug/L (0.13 ppm), approximately two orders of magnitude lower than in soil (15 ppm).

The results of the semi-volatile analyses for samples from MW-2 and MW-4 are summarized in Table 8. Of the target compounds (the compounds on the U.S. EPA Hazardous Substance List, for which the analysis is calibrated), only one was detected at a non-quantifiable (trace) level in MW-4. In MW-2, six were detected, three at non-quantifiable (trace) concentrations and three at or above detection limits: naphthalene, 2-methylnaphthalene, and 2-nitroaniline. Four of the semi-volatiles detected (in MW-2 only) belong to a class of componds referred to as polynuclear aromatic hydrocarbon (PAH): naphthalene, 2-methylnaphthalene, acenaphthene, and phenanthrene. They are common constituents of petroleum, coal, and petroleum and coal tar derivatives. The U.S. EPA has determined that there is insufficient evidence to propose a criterion level for the protection of freshwater aquatic life for PAH as a class, although individual levels of 1700 ug/L and 620 ug/L have been set for acenaphthene and naphthalene respectively. The preferred PAH concentration in drinking water for the protection of human health is zero, although it is recognized that this level may not be technologically or economically feasible. 2-nitroaniline is an intermediary in the manufacture of dyes, anti-oxidants, pharmaceuticals and pesticides; the reason for its presence in groundwater at this site is not clear. There are currently no criteria regulating the permissible concentration of 2-nitroaniline in water. Bis-(2-ethylhexyl) phthalate is common in many plastics, and is often reported as a result of cross-contamination in sampling and/or analysis; the ambient water criterion for this compound for the protection of human health is 15,000 ug/L. Laboratory review of the semi-volatile analyses indicate that the non-target semi-volatile compounds in the groundwater samples from MW-2 and MW-4, when they could be tentatively identified, consisted of benzenes and methylnaphthalenes, components of petroleum-derived fuels.

Results of analyses for PCB's and pesticides in groundwater from MW-2 and MW-4 are available in Appendix A-4. None were detected in either sample.

Results of the remaining analyses on groundwater from MW-2 and MW-4 (oil and grease, phenol, cyanide, and selected metals) are summarized in Table 9. The only federal maximum contaminant level (MCL) exceeded is the level for chromium in MW-2; the

TABLE 8

SUMMARY OF SEMI-VOLATILE CONCENTRATIONS IN GROUNDWATER
CV-OPTION PROPERTY

SEMI-VOLATILE COMPOUNDS (1)	DETECTION LIMIT	MW-2	MW-4
NAPHTHALENE	10	13	-
2-METHLYLNAPHTHALENE	10	23	-
2-NITROANILINE	50	50	-
ACENAPHTHENE	10	J	-
PHENANTHRENE	10	J	-
BIS (2-ETHYLHEXYL) PHTHALATE	10	J	J
ALL OTHERS	10-50	-	-

NOTES:

All concentrations reported in ug/L
- = not detected
J = present at less than detection limit

(1) includes 65 semi volatile compounds on the U.S. EPA Hazardous Substance List

TABLE 9

SUMMARY OF OIL AND GREASE, PHENOL, CYANIDE, AND METALS CONCENTRATIONS IN GROUNDWATER, CV-OPTION PROPERTY

PARAMETER	DETECTION LIMIT	SAMPLE CONCENTRATIONS MW-2	MW-4	MCL (1)
OIL AND GREASE	0.005	2	11	*
PHENOL	0.010	0.013	-	*
CYANIDE	0.010	-	-	*
METALS				
arsenic	0.010	-	-	0.050
cadmium	0.005	-	-	0.010
chromium	0.010	0.173	0.019	0.050
copper	0.025	-	-	1.0
mercury	0.0005	-	-	0.002
nickel	0.040	0.057	-	*
lead	0.005	-	-	0.050
zinc	0.020	0.044	0.082	5.0

NOTES:

All concentrations in mg/L
- = not present above detection limit
* = no data available

(1) Maximum Contaminant Level, equivalent to Federal interim primary and secondary drinking water standards adopted by State of Vermont

reported concentration (0.173 mg/L) is approximately three and one-half times the MCL. Chromium was also detected in MW-4, but was at a concentration less than half the MCL in that well.

The oil and grease analysis does not measure an absolute quantity of a specific substance, but rather a group of substances with similar physical characteristics. Oils and greases arae determined on the basis of their common solubility in Freon. The oil and grease method will measure sulfur compounds, chlorophyll, certain organic dyes, biological lipids, and mineral hydrocarbons, including petroleum distillates, as well as other extractable organic compounds. Despite the analytical interferences and limitations, the method is useful as a general indicator of oil and grease contamination. background levels determined by the oil and grease method in uncontaminated soils are generally accepted to be 50 mg/Kg or less, and in uncontaminated groundwater or surface water to be 1 mg/L or less. Concentrations of oil and grease reported for MW-2 and MW-4 (2 and 11 mg/L respectively) therefore indicate a generalized impact from oils on groundwater above expected background conditions.

Although MCL's do not exist for phenol and cyanide in drinking water, the concentrations found were either below detection limits or well below the criteria for protection of human health (3.5 mg/L for phenol, 0.200 mg/L for cyanide).

3.3 CONCLUSIONS

A review of the results discussed in Section 3.2 leads to the following conclusions concerning the significance of the findings of the on-shore investigation:

- Evidence of impacts on soils from petroleum oils (based on visual evidence of staining and VOC analyses) was found at two out of five drilling locations, both located in the old oil storage yard (MW-2 and MW-4). By correlation with earlier analyses for organic residue (Aquatec, 1985), soil over as much as 4.5 acres may contain total concentrations of petroleum products in excess of 1,000 ppm; the volatile fraction of the compounds appears to represent only 4 to 15 ppm in the soils sampled by WESTON, and is composed primarily of xylenes and ethylbenzene. The most volatile components of fuels (benzene, toluene) are absent from these soils.

- Corresponding impacts on groundwater beneath the site were found to be relatively small or absent. No floating product was found on the water table in any of the monitor wells. The total dissolved VOC concentration in groundwater was less than 0.13 ppm at MW-2, two orders of magnitude less than in soils from the same location, and was less than detection limit (0.010 ppm) in MW-4 and in the other monitor wells. Semi-volatile compounds sampled at MW-2 and MW-4 consisted primarily of polynuclear aromatic hydrocarbons at relatively low levels detected in MW-2, and were not present in MW-4. Chromium was the only metal found above drinking water standards, and only in MW-2.

- Review of the body of chemical data suggests that petroleum-derived fuels are the most likely source of the compounds found on the property. Overall concentrations in groundwater are relatively low. The three downgradient wells, closest to the lake, exhibit traces or no detectable concentrations of hazardous compounds. This appears to be related to the length of time since the property was last used, and the large volumes of water that move as recharge through the soils and laterally through the aquifer beneath the site. It appears that the most mobile components of petroleum-derived fuels which may have been spilled at the site have already been flushed out of the soils and diluted in the underlying zone of groundwater movement. The remaining residual in the soil represents a relatively inert, non-mobile fraction of the products that may originally have been present.

SECTION 4

OFF-SHORE INVESTIGATION

The purpose of the off-shore investigation was to determine the suitability of near-shore lake sediment for dredging and the potential water quality impacts on the lake water in the inner harbor from such dredging. This evaluation was made from sediment samples collected at four off-shore locations, from which elutriates were prepared using lake water from the same station. Results from bulk sediment analyses and elutriate analyses were compared to analytical results for a representative background lake water sample to determine potential impacts.

4.1 FIELD METHODS

Off-shore sampling was performed on 24 and 25 February 1986. At that time, ice approximately 2 feet thick covered the lake surface in the inner harbor. Bottom sediment samples were collected from four off-shore stations with a tripod-mounted power-driven hammer and split-spoon assembly operated by Con-Tec, Inc., of Concord, New Hampshire. Locations for the off-shore sampling stations, referred to as SS-1 through SS-4, are shown in Figure 8. Boring logs prepared by Con-Tec for each of the stations are provided in Appendix B-1.

The sampling procedure for each of the stations was generally the same, and can be described as follows:

- a hole was cut in the ice with a hand auger and the depth to the lake bottom was checked. Sampling was initiated if the depth to bottom was determined to be 2 to 7 feet beneath the ice.

- twelve liters of water were collected from the station using a bottom-loading teflon bailer to collect the sample from approximately the middle of the water column. The samples were collected in clear glass liter bottles and stored, unpreserved and cooled, for overnight shipping to the laboratory.

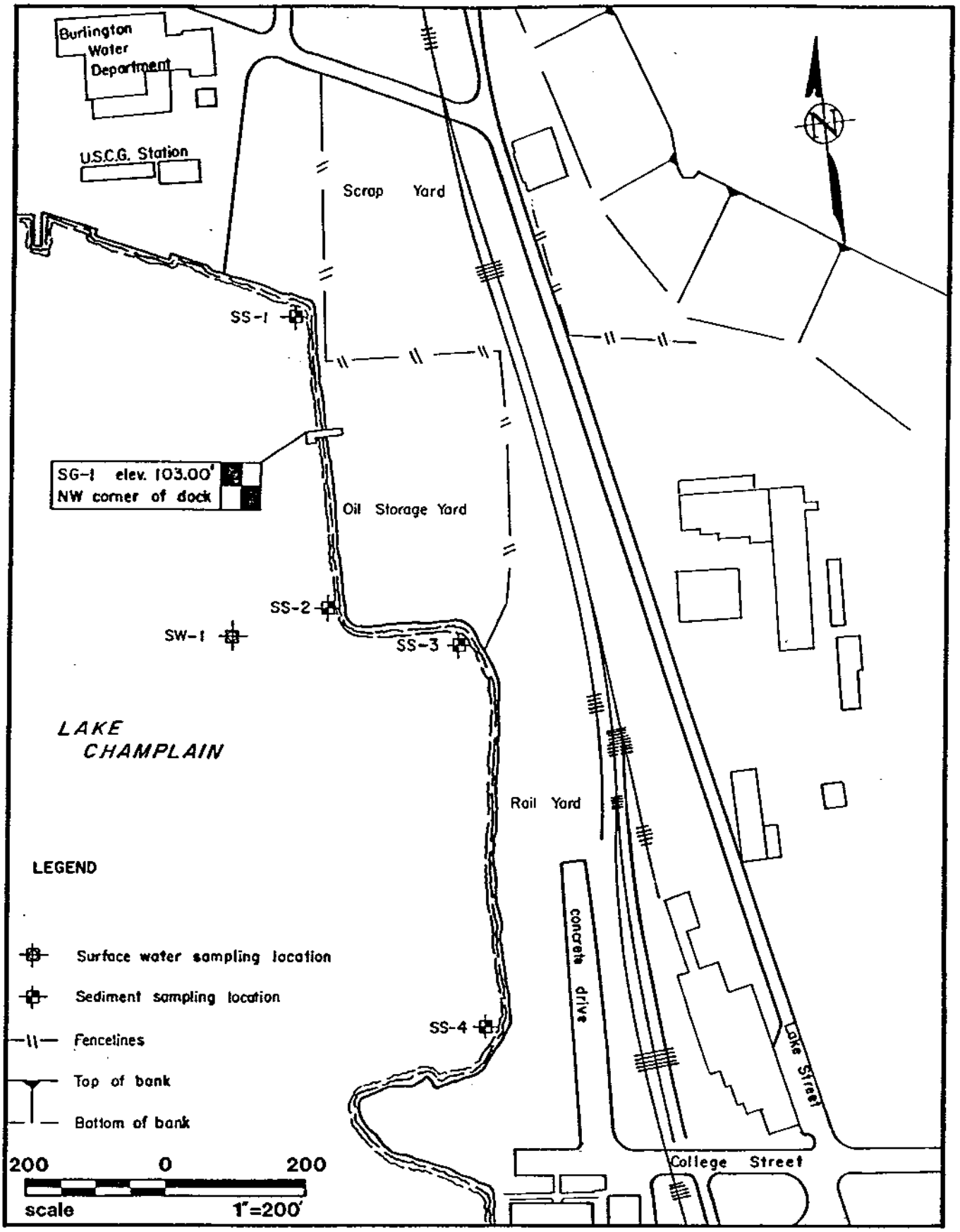


FIGURE 8

OFF-SHORE SAMPLING STATION LOCATIONS, CV-OPTION PROPERTY

- a four-inch steel casing was set and allowed to settle 1 to 2 feet into the bottom, and then driven another 1 to 2 feet for stability. A two-foot long split spoon sampler was driven and retrieved four times to collect a continuous sample from the top 8 feet of sediment.

- samples were screened in the field for total volatile organics (TVO) as each split spoon was opened, using an HNu PI-101 photoionization detection unit. No detectable levels of TVO were measured in any of the samples; however, the normal function of the instrument may have been impaired by extremely cold air temperatures at the time of sampling.

- discrete sediment samples were collected, taking care to minimize sample disturbance, from the top (0-2 foot interval) and bottom (6 to 8 foot interval) split spoons, and transferred to appropriate containers for analysis of volatile organic compounds (VOC).

- the remainder of the sediment collected from the 8 foot continuous sample was composited by mixing in a clean stainless-steel container, and divided between four clean glass liter bottles.

- this process was repeated three to four times at each station until a total volume of approximately 4 liters of bulk sediment sample had been collected.

To obtain a sample of background lake water in the inner harbor, a fifth station, SW-1, was established approximately 150 feet off-shore. A hole was cut in the ice and water was collected with a clean teflon bailer approximately 20 feet below the ice. The total depth to sediment beneath this station was over 30 feet. Water samples from this station were stored in appropriate containers and preserved according to U.S. EPA guidelines.

All samples were shipped to WESTON's laboratory in Lionville, Pennsylvania for analysis. Analytical requirements for each sample fraction are summarized in Figure 9. Elutriates were prepared in the laboratory by vigorously mixing one part sediment with four parts water (volume to volume) for 30 minutes followed by settling and filtration, according to U.S. Army Corps of Engineer procedures (Plumb, 1981). In general, analytical methods followed U.S. EPA Contract Laboratory Program (CLP)

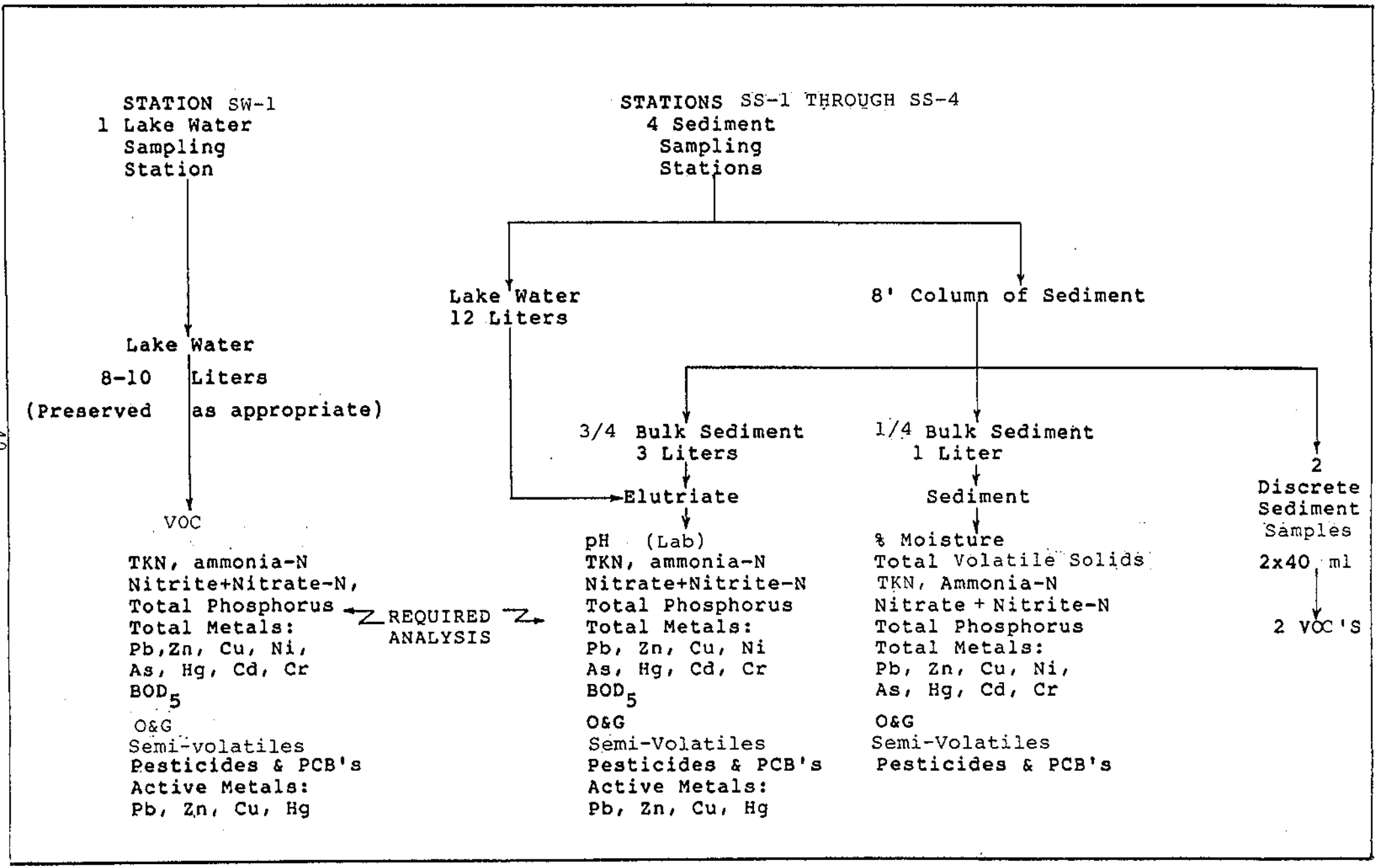


Figure 9. Summary of Off-shore Sampling and Analytical Protocol

protocols and standard U.S. EPA methods, except where modifications were necessary to achieve lower detection limits. Complete laboratory reports are provided in Appendix B-2. Analytical results of the off-shore investigation are discussed in detail in Section 4.2.2.

4.2 RESULTS

This section summarizes the findings of the off-shore investigation, including physical conditions of the near-shore lake bottom (substrate) and the results of chemical analysis of bottom sediments and lake water.

4.2.1 Substrate Conditions

Near-shore water depth was tested in several locations to insure appropriate submergence at each sampling point. The lake bottom was found to drop off sharply from the shoreline, corresponding to a slope in excess of 50 percent. An attempt was made to sample sediments submerged under approximately 4 feet of water, but in some cases locations had to be adjusted due to the presence of bouldery rip-rap and bulky debris which prevented penetration of the casing and sampler into the substrate. Final sampling locations were from 10 to 30 feet off-shore (Figure 8). Based on an estimated elevation of 95 feet MSL at the top of ice, the interval actually sampled ranged from between 80 and 88 feet MSL at SS-2 to between 85 and 92 feet MSL at SS-3. Maximum dredging depths are not expected to extend below a level of 84 feet MSL, based on the Site Schematic Grading Master Plan dated September 1984, provided by CV.

In general, bulky debris consisting of bouldery rip-rap and concrete blocks, was encountered only at the surface of substrate, within 20 feet of shore. Off-shore sediments at the sampling locations were found to consist of grey-green fine to medium loose sand and silt with some gravel. An organic rich, very loose silt layer was present at the top of the substrate, and fill debris (wood chips, pieces of bricks, cinders) were noted mixed in the top 5 feet of sandy sediment. A dense to very dense dark grey silt was noted below a depth of 13.5 feet in boring SS-1, and an increase in density was also noted below a depth of 14 feet in SS-2. This density increase may indicate the presence of natural silts and fine sands below an elevation of 81 feet MSL; the other two borings (SS-3 and SS-4) were finished above this elevation.

These observations are supported by the findings of the Aquatec, Inc. study (1985). The report for that study described the lake bed as consisting of "black silt to very fine sand in the top two feet..., underlain by grey medium to fine sands with layers of grey Silt." Five off-shore borings were performed within approximately 50 feet of shore along the CV property by Green Mountain Boring Co., Inc., for Knight Consulting Engineers. Total depths in the borings ranged from 25 to 65 feet. Split spoon samples recovered at five-foot intervals were logged primarily as fine silty sand with occasional trace of clay below depths of 15 to 25 feet; the overlying sediment was classified variously as clay and silt, medium to coarse sand, and sand with small stones.

As noted in Section 4.1, sediments were screened in the field for TVO, and no detectable levels were measured. However, an oil-like substance was observed to be released from the sediments into the lake water as the boring was advanced at all stations, and was most noticeable at SS-3. Dark staining and a strong petroleum odor were noted in a single sample, from a depth of 8 to 10 feet below ice level at SS-3. A discrete sample for VOC was collected from this interval, and the rest of the sample was composited with sediment from other levels for elutriate and bulk sediment analysis. No oily staining was noted in any of the other sediments sampled.

In the earlier Aquatec Study (1985), a series of off-shore sediments were tested for organic residues, and the study found that "there is no linear dispersion relationship of organic residue concentrations between the sample location and the tank farm and scrap yard." Based on these results, it was concluded that petroleum oils present in lake bottom sediments were the result of localized off-shore spills rather than seepage or runoff from the on-shore property.

4.2.2 Analytical Results for Off-Shore Samples

Full analytical reports for the off-shore investigation are provided in Appendix B-2, and results (for the compounds detected) are summarized in Tables 10 through 13. Two discrete sediment samples were collected from each station for analysis of VOC, and these results are summarized in Table 10.

TABLE 10

SUMMARY OF VOC CONCENTRATIONS IN OFF-SHORE SAMPLES
CV-OPTION PROPERTY

	LAKE WATER CONCENTRATIONS (ug/L)	SEDIMENT CONCENTRATIONS (ug/Kg)							
SAMPLE POINT NO.:	SW-1	SS-1	SS-1	SS-2	SS-2	SS-3	SS-3	SS-4	SS-4
SAMPLE DEPTH IN SEDIMENT COLUMN:		1 FT	7 FT	1 FT	7 FT	1 FT	7 FT	1 FT	7 FT
DETECTION LIMIT:	10	28	25	29	12	44	14	80	11
VOLATILE ORGANIC COMPOUNDS (1)									
CHLOROETHANE	-	-	-	-	J	-	-	-	-
METHYLENE CHLORIDE	J	42	37	38	34	200	59	120	16
ACETONE	J	680	84	230	-	370	350	330	16
CARBON DISULFIDE	J	J	31	90	27	300	46	110	14
CHLOROFORM	-	J	J	J	J	J	J	J	J
2-BUTANONE (MEK)	J	160	100	38	J	240	82	390	11
TOLUENE	-	-	-	J	-	J	J	J	-
XYLENES	-	68	-	-	-	-	-	-	-
TRICHLOROFLUOROMETHANE	-	-	-	-	-	-	J	-	-
ALL OTHERS	-	-	-	-	-	-	-	-	-

NOTES: - = Not detected
J = Present at less than detection limit

(1) Includes 35 VOC on the U.S. EPA Hazardous Substance List

VOC compounds reported consistently in all samples were methylene chloride, acetone, carbon disulfide, and 2-butanone. All four compoundcs are potentially introduced into the sample in the laboratory extraction process; concentrations of these compounds up to five times the detection limit for the sample can be considered to represent background contamination of the sample. Toluene was detected at non-quantifiable trace levels in 4 samples, xylenes in a single sample (the upper sample from SS-1) at a concentration of 68 ug/Kg. On the basis of these results, concentrations of fuel-derived VOC compounds in off-shore sediments can be considered to be low (less than 100 mg/Kg).

Analytical results for semi-volatile (base-neutral and acid-extractable) analyses performed by U.S. EPA method 625 are summarized in Table 11. Results for lake water, elutriates, and bulk sediment samples are all included in Table 1. Semi-volatile compounds consisting primarily of polynuclear aromatic hydrocarbons (PAH's) were detected at non-quantifiable trace levels in sediments from SS-1 and at concentrations ranging from non-quantifiable traces to 2500 ug/Kg (2.5 ppm) in SS-2, SS-3 and SS-4 sediments. In addition, two phthalate compounds were reported in SS-2. Elutriates from the same station contained no PAH's, and only relatively low levels (less than 20 ug/Kg) of phthalates and pentachlorophenol (PCP, a wood preservative). This is because PAH's have a very low solubility, and tend to stay firmly bonded to sediment particles, even when they are disturbed. Phthalate esters and PCP are somewhat more soluble; however, they occur in the elutriates (Table 10) well below the guideline concentrations for protection of human health and protection of freshwaster aquatic life. No semi-volatile compounds were detected in the sample of lake water from SW-1.

Pesticides and PCB's were analyzed in elutriates, bulk sediments and lake water; results are reported in Appendix B-2. None were detected in any of the elutriates, down to detection limits of 0.005 ug/L for the pesticides and 0.05 ug/L for the PCB's. No PCB's were detected in any of the bulk sediment, and a single pesticide was detected, in one soil sample only, from station SS-4: 4,4-DDD at a non-quantifiable trace concentration (below 20 ug/Kg).

Results of inorganic analyses (moisture content, total volatile solids, pH, BOD_5, oil and grease, nitrogen compounds, phosphorus and metals) are summarized in Tables 12 and 13. Table

TABLE 11

SUMMARY OF SEMI-VOLATILE CONCENTRATIONS IN OFF-SHORE SAMPLES
CV-OPTION PROPERTY

	LAKE WATER CONCENTRATIONS (ug/L)		ELUTRIATE CONCENTRATIONS (ug/L)					BULK SEDIMENT CONCENTRATIONS (ug/Kg)				
SAMPLE POINT NO.:	SW-1	SW-1(R)	SS-1	SS-2	SS-3	SS-3(R)	SS-4	SS-1	SS-1(D)	SS-2	SS-3	SS-4
DETECTION LIMIT (2):	10/50	10/50	10/50	10/50	10/50	10/50	10/50	430/2150	420/2100	420/2100	430/2150	420/2100
SEMI-VOLATILE ORGANIC COMPOUNDS (1)												
4-CHLORO-3-METHYLPHENOL	-	-	-	-	-	-	-	-	-	-	J	-
N-NITROSO-DI-N-PROPYLAMINE	-	-	-	-	-	-	-	-	-	-	J	-
1,2,4 TRICHLOROBENZENE	-	-	-	-	-	-	-	J	-	-	-	-
NAPHTHALENE	-	-	-	-	-	-	-	-	-	-	J	J
ACENAPHTHENE	-	-	-	-	-	-	-	-	-	-	-	J
DIBENZOFURAN	-	-	-	-	-	-	-	-	-	-	-	J
FLUORENE	-	-	-	-	-	-	-	-	-	-	-	-
PENTACHLOROPHENOL	-	-	J	16	-	-	-	J	J	J	J	1500
PHENANTHRENE	-	-	-	-	-	-	-	-	-	J	J	480
ANTHRACENE	-	-	-	-	-	-	-	J	J	860	1000	2500
FLUORANTHENE	-	-	-	-	-	-	-	J	J	860	940	2100
PYRENE	-	-	-	-	-	-	-	J	-	430	440	1400
BENZO(A) ANTHRACENE	-	-	-	-	-	-	-	J	J	480	480	1300
CHRYSENE	-	-	-	-	-	-	-	J	-	530	J	890
BENZO(B) FLUORANTHENE	-	-	-	-	-	-	-	-	-	-	J	720
BENZO(K) FLUORANTHENE	-	-	-	-	-	-	-	J	-	420	J	1000
BENZO(A) PYRENE	-	-	-	-	-	-	-	J	-	J	J	590
BENZO(G,H,I) PERYLENE	-	-	-	-	-	-	-	-	-	-	-	J
DIBENZO(A,H) ANTHRACENE	-	-	-	-	-	-	-	J	-	J	J	610
INDENO(1,2,3-C,D) PYRENE	-	-	-	-	-	-	-	-	-	-	-	J
BIS (2 ETHYLHEXYL) PHTHALATE	-	-	-	-	-	-	-	-	-	-	-	-
DIETHYL PHTHALATE	-	-	-	J	-	-	-	-	-	-	-	-
DI-N-BUTYL-PHTHALATE	-	-	14	15	J	J	J	-	-	1020	-	-
BUTYL BENZYL PHTHALATE	-	-	-	-	-	-	-	-	-	800	-	-
ALL OTHERS	-	-	-	-	-	-	-	-	-	-	-	-

NOTES:
- = Not detected
J = Present at less than detection limit
(R) = Laboratory replicate analysis

(1) Includes 65 semi-volatile compounds on the U.S. EPA Hazardous Substance List
(2) Detection limit varies by compound; see full laboratory report in Appendix B-2

TABLE 12

SUMMARY OF INORGANIC CONCENTRATIONS IN OFF-SHORE SAMPLES, BULK SEDIMENTS
CV-OPTION PROPERTY

PARAMETER	SEDIMENT CONCENTRATIONS (mg/Kg) SS-1	SS-1 (R)	SS-2	SS-2 (R)	SS-3	SS-3 (R)	SS-4	SS-4 (R)	BULK SEDIMENT AVERAGES (mg/Kg)	TYPICAL BACKGROUND CONCENTRATIONS (mg/Kg) IN U.S. SOILS (1)	IN TOP 2 cm OF LAKE CHAMPLAIN SEDIMENTS (2)
moisture content (%)	21.2	*	17.8	*	21.3	*	17.6	*	19.5	*	*
total volatile solids (%)	21.6	*	*	*	24.0	*	20.4	*	22.0	*	*
oil and grease	8.59	305	125	*	190	*	1400	*	507	*	*
nitrate-nitrite (as N)	0.50	*	0.75	*	0.50	*	0.50	*	0.56	*	*
ammonia (as N)	<10	*	<10	<10	<10	*	<10	*	<10	*	*
total Kjehldahl nitrogen	97.3	97.3	150	*	78.6	*	4.22	*	83	*	*
total phosphorus	383	370	260	394	427	474	381	*	384	*	500-1100
TOTAL METALS											
arsenic	1.27	1.28	1.56	*	1.43	1.45	1.31	*	1.40	<0.1-97	*
cadmium	<0.482	<0.486	<0.502	*	<0.479	<0.490	<0.475	*	<0.5	0.01-0.70	<2
chromium	6.85	7.68	7.33	*	5.26	6.57	8.93	*	7.36	1-4000	65-108
copper	4.54	5.25	12.3	*	10.7	8.53	8.26	*	8.77	<1-700	32-73
mercury	<0.250	*	<0.250	*	<0.250	*	<0.250	<0.276	<0.250	<0.01-4.6	*
nickel	8.59	8.75	9.43	*	9.48	9.32	9.88	*	9.35	<5-700	69-99
lead	21.6	20.7	33.6	*	31.9	46.0	47.6	*	35.3	<10-700	48-123
zinc	23.9	24.1	31.1	*	38.0	39.8	106	*	46.1	<5-2900	126-257

NOTES: (R) = laboratory replicate analysis
* = no data available

(1) = References: Shacklette and Boerngen (1984), and Baker and Chesnin (n.d.)
(2) = References: Hunt (1971, 1975), Hunt and Corliss (1971)

TABLE 13

SUMMARY OF INORGANIC CONCENTRATIONS IN OFF-SHORE SAMPLES, ELUTRIATES AND LAKE WATER
CV-OPTION PROPERTY

PARAMETER	ELUTRIATE CONCENTRATIONS (mg/L) SS-1	SS-2	SS-2 (R)	SS-3	SS-3 (R)	SS-4	SS-4 (R)	ELUTRIATE AVERAGES (mg/L)	LAKE WATER CONCENTRATIONS (mg/L) SW-1	SW-1 (R)
pH (standard units)	7.4	7.6	*	7.5	*	7.7	*	7.6		*
oil and grease	<1	1	<1	<1	*	3	*	<2	<1	*
BOD5	195	90	*	>240	*	54	*	>145	<1	*
nitrate-nitrite (as N)	0.40	0.30	*	0.20	*	0.30	*	0.30	0.20	*
ammonia (as N)	<0.10	<0.10	*	0.28	0.29	0.51	0.51	<0.25	<0.10	*
total Kjehldahl nitrogen	0.36	0.71	0.63	0.50	*	0.90	*	0.27	0.29	0.27
total phosphorus	<0.02	<0.05	*	<0.05	<0.05	<0.05	*	<0.05	<0.05	*
TOTAL METALS										
arsenic	<0.010	<0.010	*	<0.010	<0.010	<0.010	*	<0.010	<0.010	<0.010
cadmium	<0.0025	<0.0025	*	<0.0025	*	<0.0025	<0.0025	<0.0025	<0.0025	*
chromium	0.011	0.018	*	<0.010	*	0.016	0.031	<0.016	0.019	*
copper	<0.010	<0.010	*	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
mercury	<0.0005	0.00068	*	<0.0005	*	<0.0005	*	<0.0006	<0.0005	*
nickel	<0.010	<0.010	*	<0.010	*	<0.010	<0.010	<0.010	<0.010	*
lead	0.014	0.414	*	0.005	<0.005	0.005	0.038	<0.114	0.010	<0.005
zinc	0.028	0.018	0.030	0.037	*	0.036	0.017	0.029	0.017	<0.010
ACTIVE METALS (ACID-SOLUBLE)										
copper	0.068	0.077	*	0.080	*	0.100	*	0.081	0.083	0.083
mercury	<0.0005	<0.0005	*	0.0019	*	<0.0005	*	<0.0009	0.0006	*
lead	0.005	<0.005	*	<0.005	*	<0.005	*	<0.005	<0.005	<0.005
zinc	0.055	0.044	*	0.050	*	0.043	*	0.048	0.027	0.023

NOTES: (R) = laboratory replicate analysis
* = no data available

12 summarizes the results of bulk sediment analyses, including averages for the four samples analyzed. For comparison, table 12 also provides (where available) typical ranges of concentrations of the same parameters in naturally-occurring soils throughout the United States, and concentrations in Lake Champlain sediments (top two centimeters) reported by Hunt (1971). Table 13 summarizes analytical results for elutriates SS-1 through SS-4 and lake water from station SW-1. Applicable water quality standards and guidance criteria for the parameters analyzed are summarized in Table 14.

Additional information on raw lake water quality was obtained from the Burlington Water Treatment Plant (Smith, 1986, personal communication). Raw water at the plant intake typically has a pH of 7.5 and a hardness of 50 ug/L as $CaCo_3$. This information was used to derive applicable guidance criteria for other parameters, including metals, listed in Table 14.

Moisture content in the sediments ranged from 17.6 to 21.3 percent, and total volatile solids (TVS) from 20 to 24 percent by dry weight (one analysis for TVS at SS-2 was inadvertently omitted from the analytical protocol). Concentrations of oil and grease in sediment varied widely, from 8.6 to 1400 mg/Kg (Table 12); background levels of oil and grease in sediments would be expected to be 50 mg/Kg or less. Oil and grease concentration in elutriates were 1 mg/L or less in SS-1, SS-2 and SS-3, and only 3 mg/L in SS-4 (Table 13). This tends to support the concept that petroleum residues in the sediments sampled consist primarily of the less mobile, semi-volatile fractions of fuels and are generally not very soluble. BOD_5 concentrations were less than 1 mg/L in lake water, and ranged from 54 to more than 240 mg/L in the elutriates, presumably due to the presence of biodegradable organic matter in the sediments elutriated.

Total Kjehldahl nitrogen (TKN) concentration in sediment ranged from 4 to 150 mg/Kg, and averaged 83 mg/Kg. The average TKN concentration in the elutriates was 0.61 mg/L, approximately twice the concentration in lake water (0.27 to 0.29 mg/L). Nitrate-nitrite concentrations in the elutriates averaged 0.30 mg/L, well below the drinking water standard of 10 mg/L. Ammonia concentrations in the elutriates averaged less than 0.25 mg/L, below the guidelines for protection of freshwater aquatic life. Total phosphorus concentrations in the bulk sediments were very consistent, ranging from 260 to 474 mg/Kg, and were below the concentrations given by Hunt and Corliss (1971) for sediments in Lake Champlain (500 to 1,100 mg/Kg). Total phosphorus concentrations were below 0.05 mg/L in all elutriates.

TABLE 14

SUMMARY OF WATER QUALITY STANDARDS AND CRITERIA FOR INORGANIC PARAMETERS IN WATER
CV-OPTION PROPERTY

	WATER QUALITY STANDARDS AND CRITERIA (mg/L)						
	FEDERAL INTERIM DRINKING WATER	PROPOSED RMCL	U.S. EPA WATER QUALITY CRITERIA (3)				
			HUMAN HEALTH (6)	FRESHWATER AQUATIC (4)		FRESHWATER AQUATIC (5)	
PARAMETER	STANDARD (1)	(2)		24-HOUR	MAXIMUM	4-DAY AVG	1-HOUR AVG
pH (standard units)	6.5-8.5	*	*	*	*	*	*
oil and grease	*	*	*	*	*	*	*
BOD5	*	*	*	*	*	*	*
nitrate-nitrite (as N)	10	10	*	*	*	*	*
ammonia (as N)	*	*	*	*	*	1.8	12.7
total Kjehldahl nitrogen	*	*	*	*	*	*	*
total phosphorus	*	*	*	*	*	*	*
TOTAL METALS							
arsenic	0.050	0.050	0.0022	*	0.440	0.190	0.360
cadmium	0.010	0.005	0.010	0.000012	0.0015	0.00066	0.0018
chromium	0.050	0.120	0.050	0.00029	0.021	0.011	0.016
copper	1.0	1.3	*	0.0056	0.012	0.0065	0.0092
mercury	0.002	0.003	0.0001	0.00000057	0.0000017	0.000012	0.0024
nickel	*	*	0.0134	0.056	1.10	*	*
lead	0.050	0.020	0.050	0.0075	0.074	0.0013	0.034
zinc	5.0	*	*	0.047	0.180	*	*
ACTIVE METALS (ACID-SOLUBLE)							
copper	*	*	*	*	*	0.0065	0.0092
mercury	*	*	*	*	*	0.000012	0.0024
lead	*	*	*	*	*	0.0013	0.034
zinc	*	*	*	*	*	*	*

NOTES: * No data available

(1) Reference: 40 CFR 141:40, Federal Register, 14 November 1985
(2) Reference: 40 CFR 141:40, Federal Register, 18 November 1985
(3) Assume average hardness of lake water is 50 mg/L as CaCO3, average pH is 7.5, and temperature is 10oC
(4) Reference: Federal Register, 28 November 1980
(5) Reference: Federal Register, 29 July 1985
(6) Human health criterion for arsenic based on 10-6 cancer risk; all others based on toxicity

Eight metals (arsenic, cadmium, chromium, copper, mercury, nickel, lead, and zinc) were analyzed in the bulk sediment and elutriates. All of the metals concentrations reported in sediments were within ranges reported as typical in naturally occurring soils in the United States (Shacklette and Boergen, 1984) and were generally lower than the concentrations reported by Hunt (1971) in the top 2 centimeters of sediment collected from Lake Champlain in the Burlington/Shelburne Bay area. No significant differences were noted between average elutriate concentrations of arsenic, cadmium, chromium, copper (total and active), mercury (total and active) or nickel, although concentrations reported for individual elutriates occasionally exceeded background levels. Concentrations of zinc (both total and active) were found to be consistently higher in the elutriates than in lake water. Although zinc concentrations in the elutriates were well below the drinking water standard of 5 mg/L, they were close to or slightly in excess of the 24-hour average guideline concentration for protection of aquatic life of 0.047 mg/L (Table 14). Results of lead analyses in elutriates tended to exhibit poor reproducibility between replicates and no correlation with bulk sediment concentrations; a relatively elevated concentration of 0.414 mg/L was reported for the eluatriate from SS-2, but this result is considered anomalous by comparison with other elutriate concentrations and bulk sediment results for lead. On the basis of these results, potential impacts on metals concentrations in lake water from the proposed dredging appears to be minor.

4.3 CONCLUSIONS

A review of the results discussed in Section 4.2 leads to the following conclusions concerning the off-shore investigation:

- On the basis of oil and grease results, off-shore sediments in all four boring locations sampled appear to have been impacted by petroleum oils. Oil and grease concentrations in SS-1 through SS-3 were two to three times the expected natural concentration of 50 mg/Kg; in SS-4, the oil and grease concentration was 1400 mg/Kg. However, physical evidence (visual inspection of samples, odor) indicates that there is no widespread staining or saturation of sediments with oil, although localized staining was noted in a single boring (SS-3).

- On the basis of organic analytical results, oily residues in the sediment appear to be made up primarily of the non-volatile and semi-volatile fractions of petroleum fuels, which have relatively low solubility. This is supported by the oil and grease results for the elutriates, which were 3 mg/L or less in all elutriates.

- No PCB's or pesticides were detected in sediments or elutriates, except for a non-quantifiable trace of a single pesticide in a single sediment sample.

- Elutriate analyses indicate that there could be a potential impact on the BOD_5 of the water column from introduction of biodegradable organic matter during dredging; however, no significant potential impact on nutrient levels (phosphorus or nitrogen compounds) was evident.

- Potential impacts from dredging related to the metals sampled (As, Cd, Cr, Cu, Hg, Ni, Pb, Zn) appear to be minor. Zinc is the only metal which was found at consistently higher levels in elutriates than in background lake water; zinc is a naturally-occurring element and, compared to the other metals sampled, has relatively low toxicity.

REFERENCES

Aquatec, Inc., 1985. Subsurface Investigation for Alden Waterfront Corporation and Central Vermont Railway, Inc, private report, 10 p. & Appendices.

Baker, D.E. and L. Chesnin, n.d. Chemical Monitoring of Soils for Environmental Quality and Human Health, Contribution to the Journal Series of The Agricultural Experiment Station of the Pennsylvania State University (No. 4985).

Bouwer, H. and Rice, R.C., 1976. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers With Completely or Partially Penetrating Wells; Journal of Water Resources Research, v. 12, no. 3, p. 423-429.

Cedergren, H.R., 1977. Seepage, Drainage and Flow Nets; John Wiley & Sons, New York.

Heindel, C.D., 1980. Glacial Geology, Hydrogeology, and Road Salt Effects on Groundwater in the Williston Area, Vermont; Masters Thesis, March 1980, University of Vermont.

Hodges, A.E., 1967. Groundwater Favorabililty Map of the Winooski River Basin, Vermont; Vermont Department of Water Resources.

Hunt, Allen S., 1971. Bottom Sediments of Lake Champlain: 1965-71; Completion Report to OWRR, Burlington, Vermont, 127 p.

Hunt, Allen S., 1975. Sediment Properties, Lake Champlain: 1971-1975; Completion Report to OWRR, Burlington, Vermont, 85 p.

Hunt A.S. and B.H. Corliss, 1971. The Distribution of Phosphorus in the Sediments of Lake Champlain; unpublished manuscript in: Hunt, 1971.

New England River Basin Commission, Lake Champlain Basin Study, n.d. Lake Champlain Shoreline Erosion Control; Pamphlet.

Plumb, R.H., Jr. 1981. Procedure for Handling and Chemical Analysis of Sediment and Water Samples; Technical Report EPA/CE-81-1, prepared by Great Lakes Laboratory, State University College at Buffalo, Buffalo, N.Y. for the U.S. Environmental Protection Agency/Corps of Engineers Technical Committee on Criteria for Dredged and Fill Material. Published by the U.S. Army Engineer Waterways Experiment Station, CE, Vicksburg, Miss.

Schacklette, H.T. and J.G. Boerngen, 1984. Element Concentrations in Soils and Other Surficial Materials of the Conterminous United States; U.S. Geological Survey Prof. Paper 1270, 105 p.

Stewart, D.P. & MacClintock, P., 1969. The Surficial Geology and Pleistocene History of Vermont; Vermont Geological Survey Bulletin No. 31.

Stewart, D.P., 1973. Geology for Environmental Planning in the Burlington-Middlebury Region, Vermont; Vermont Geological Survey, Environmental Geology No. 3.

United States Department of Agriculture, Soil Conservation Services (SCS), 1974. Soil Survey of Chittenden County, Vermont; Superintendent of Documents, U.S. Govt. Printing Office, Washington, D.C.

Vermont Dept. of Highways, Geologic Survey Section, 1961. Survey of Highway Construction Materials in the City of Burlington, Chittenden County, Vermont; VDH, Montpelier, Vermont, 8 p.

Wagner, W.P., 1971. Glacial Geology of the Champlain Valley; Completion Report to OWRR, Burlington, Vermont, 11 p.

WESTON ENGINEERS CONSULTANTS

TEST BORING LOG

BORING NO. MW-1A

PROJECT : OPTION PROPERTIES - BURLINGTON, VERMONT
SHEET NO. 1 OF 1
CLIENT : CENTRAL VERMONT RAILWAY
JOB NO. 2715.02.01.01
BORING CONTRACTOR : ADAMS ENGINEERING
ELEVATION
GROUND WATER : 6.68 FT btoc
DATE STARTED 12/16/85
DATE FINISHED 12/16/85
DRILLER G. ADAMS
INSPECTOR C. J. CARLEO

DATE	TIME	WATER EL.	SCREEN
12/24	2:00PM	6.68 btoc	0.020 in

	CAS.	SAMP.	CORE	TUBE
TYPE	AUGER	SS		
DIA.	6 in			
WT.				
FALL				

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
	0					
		S-1	SS	5/5/4	dk grey-green SILT tr. fine sand	3.5-4.9, rec. 1.4' sample wet at 4.0'
	5	S-2	SS	3/2/2/2	dk. grey-green CLAY and SILT, dk grey-green well sorted med. SAND	5.0-7.4, rec 1.35
		S-3	SS	3/2/2/3	lenses of grey silt	7.4-9.4, rec 1.7
	10	S-4	SS	1/3/6/5	dk grey f-m SAND some silt	10.5-12.9, rec 1.5
	15	S-5	SS	0/1/2/2		15.0-17.6, rec 0.6
	20	S-6	SS	2/4/5		20.7-22.2, rec. 0.6
					dk. grey f-m SAND	
	25	S-7	SS	2/3/4/6		25.7-27.7, rec 1.4
					med. brown SAND	Sand blocking up inside augers; bailed
	30	S-8	SS	5/17/11/16	dk. grey med. SAND some fine sand, tr. coarse sand	30.5-32.8, rec 2.0
	35	S-9	SS	4/5/7/6	dk grey - dk brown med. SAND some fine sand, tr. silt	35.5 - 37.5, rec. 2+
	40	S-10	SS	2/6/7	dk grey med. sand	40.1 - 41.6, rec 0.6 1.0 FT wash Sand blocking up inside augers
					BOTTOM OF BOREHOLE	
	45	S-11	SS	12/12/14	Installed 2" PVC well with steel guard pipe	45.2 - 47.7, rec 2.0

WELL CONSTRUCTION:
- 2 inch PVC, sch. 40
- Ottawa Sand + granular bentonite
- gran. bentonite
- Ottawa Sand
- 0.020 in. slot PVC
- native sands
- 6 in. Auger borehole

WESTON ENGINEERING CONSULTANTS

TEST BORING LOG
BORING NO. MW-1

PROJECT : OPTION PROPERTIES – BURLINGTON, VERMONT
SHEET NO. 1 OF 1
CLIENT : CENTRAL VERMONT RAILWAY
JOB NO. 2715-02-01-01
BORING CONTRACTOR : ADAMS ENGINEERING
ELEVATION
GROUND WATER :
DATE STARTED 12/17/85
DATE FINISHED 12/17/85
DRILLER G. ADAMS
INSPECTOR C. J. CARLEO

DATE	TIME	WATER EL.	SCREEN
12/24	1:55 PM	6.05 btoc	0.020 in. slot.

	CAS.	SAMP.	CORE	TUBE
TYPE	AUGER	SS		
DIA.	6 in.			
WT.				
FALL				

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
2 inch PVC; 0.020 in slot Ottawa Sand 6 in. Auger borehole Concrete Surface Seal Ottawa Sand & Native Material bentonite pellets Protective steel casing w/lock set in concrete	0 5 10 15 20 25 30 35 40 45	S-1	SS	3/4/3/4	Fill; grey SILT and brown f-m sand and silt BOTTOM OF BOREHOLE Installed 2 inch PVC well with steel guard pipe	S-1 2.9-4.9, rec 1.1 NO ADDITIONAL SAMPLES COLLECTED; S-1 SUBMITTED FOR CHEMICAL ANALYSES (VCC)

WESTON ENGINEERING CONSULTANTS

TEST BORING LOG

BORING NO. MW-2

PROJECT : OPTION 1 PROPERTIES - BURLINGTON, VERMONT | SHEET NO. 1 OF 1

CLIENT : CENTRAL VERMONT RAILWAY | JOB NO. 2715.02.01

BORING CONTRACTOR : ADAMS ENGINEERING | ELEVATION

GROUND WATER :					CAS.	SAMP.	CORE	TUBE
DATE	TIME	WATER EL.	SCREEN	TYPE	AUGER	SS		
12/24	1:30 PM	4.6' btoc	0.020 in	DIA.	6 in			
				WT.				
				FALL				

DATE STARTED 12/17/05

DATE FINISHED 12/18/05

DRILLER G. ADAMS

INSPECTOR C.J. CARLEO

WELL CONSTRUCTION	DEPTH FEET	NO.	TYPE	BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
2 inch 0.020 in slot PVC and riser; Ottawa Sand; 6 in. Auger borehole; Concrete Surface Seal; Bentonite Pellets; PROTECTIVE STEEL CASING w/lock set in concrete	0					
	5	S-1	SS	3/3/3/2	dark. grey f-m SAND, trace silt	3.0-5.0, rec. 1.0 moist
		S-2	SS	-		5.0-7.0, rec. 1.3 wet
	10	S-3	SS	1/1/3/2	dark brown med SAND, trace fine sand some gravel with depth	10-12, moist
	15	S-4	SS	2/5/7	dark grey fine SAND, little med sand trace silt	14.9-16.4
	20	S-5	SS		BOTTOM OF BOREHOLE, 20 FT.	20-22, rec. 2.0
					dark. grey SILT	
	25					
	30				S-1 OIL-LIKE ODOR; [illegible] 2-3 [illegible] in [illegible] casing. Background = [illegible] ppm	
	35				* blow counts > 5 packed material inside augers initially caused hard driving.	
					S-2 OIL-LIKE ODOR	
	40				NOTE: Moved borehole 3' to north drilled to 14.5' bgs then restarted SS sampling. Soil info 0-12' bgs from initial attempt. Lost auger flight to borehole	
	45					

WESTON DESIGNERS CONSULTANTS

TEST BORING LOG

BORING NO. MW-3

PROJECT : OPTION PROPERTIES: BURLINGTON VERMONT
SHEET NO. 1 OF 1
CLIENT : CENTRAL VERMONT RAILWAY
JOB NO. 2715.02.01.01
BORING CONTRACTOR : ADAMS ENGINEERING
ELEVATION
DATE STARTED 12/19/85
DATE FINISHED 12/19/85
DRILLER G. ADAMS
INSPECTOR C. J. CARLEO

GROUND WATER :

DATE	TIME	WATER EL.	SCREEN
12/24	1:30pm	7.71 btoc	0.020 in.

	CAS.	SAMP.	CORE	TUBE
TYPE	AUGER			
DIA.	6 in			
WT.				
FALL				

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
2 inch 0.020 slot PVC and riser; washed silica sand; bentonite pellets; native soil & concrete surface seal; Protective steel casing w/lock set in concrete	0	S-1	SS	5/3/3/3	stained black SAND	2.5-4.8 FT. rec 1.6
					brown f-m SAND	
	5	S-2	SS	2/4/3/4	brown f-m SAND, some silt	moist 5.3-7.3 FT. rec. 1.2
					brown f-m SAND, trace cobbles and rock chips	
	10	S-3	SS	—	brown f-m SAND, some coarse sand trace silt, trace gravel/cobbles (3/4") (lense of black-stained soil)	11.1-12.6 FT. rec. 1.5
	15	S-4	SS	3/9/11/7	brown f-m SAND	15.3-17.3 FT. rec 1.7 wet
	20	S-5	SS	10/13	BOTTOM OF BOREHOLE	20.3-22.3 FT. rec 1.8 wet
				13/16		
	25					
	30					
	35					S-1 and S-2 submitted for chemical analyses (VOC)
	40					
	45					

TEST BORING LOG

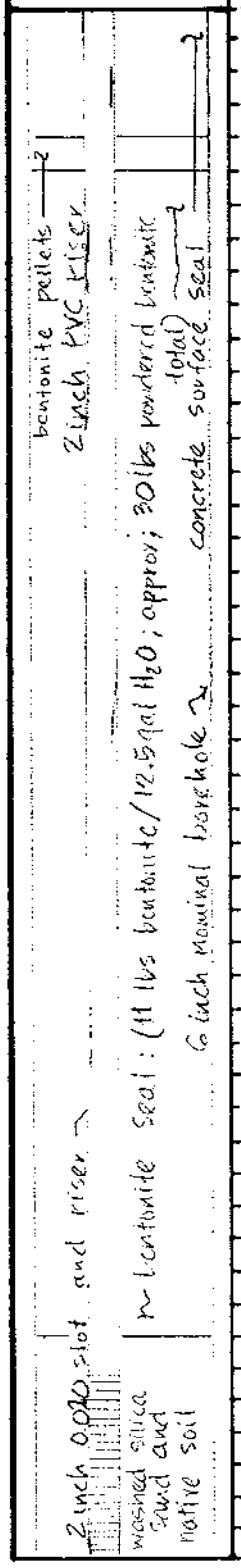
BORING NO. MW-4A

PROJECT : OPTION PROPERTIES: BURLINGTON, VERMONT
SHEET NO. 1 OF 1
CLIENT : CENTRAL VERMONT RAILWAY
JOB NO. 2715.02.01
BORING CONTRACTOR : ADAMS ENGINEERING
ELEVATION

GROUND WATER :					CAS.	SAMP.	CORE	TUBE
DATE	TIME	WATER EL.	SCREEN	TYPE	AUGER	SS		
–	–	SEE NOTE		DIA.	6in			
				WT.				
				FALL				

DATE STARTED 12/20/85
DATE FINISHED 12/23/85
DRILLER G. ADAMS
INSPECTOR C.J. CARLEO

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
	0				dark grey f-m SAND, black staining	oil-like odor
		S-1	SS	6/5	dark grey med. SAND, some fine sand little coarse sand and cobbles (1/4-3/4 inch) trace silt	2.5-5.0 ft rec 0.8 moist @ ~ 4.5 ft. oily odor
	5			4/4		
		S-2	SS	3/2		5.0-7.0 ft., rec 1.3 oily odor
				2/2	dark grey f-m SAND, some silt	
	10	S-3	SS	F/1	dark grey, med SAND, some f and c sand, trace silt and cobbles	10.6-12.6 ft., rec 1.5
				1/2/1/2		
					brown med. SAND, some f and c sand	
	15	S-4	SS	11/6/4/5	brown fine SAND, some dark grey fine sand and black cobbles (1/4"-1") some silt, little med. sand	15.-17.0 ft, rec. 1.5 Wet
		S-5	SS			19.5-21.7, rec 0.7 wet, split spoon (ss) difficult to pull.
	20				dark grey SILT	
	25	S-6	SS	3/3/4/4		25-27.0, rec 0.7 wet
	30	S-7	SS	2/6/7/5		30.2-32.2 rec 1.0 wet
	35	S-8	SS	2/4/4/4		35-37, rec 0.9 wet
	40	S-9	SS	1/2/1/4	dark grey SILT some clay and f-m sand	40-42.3, rec 1.1
						oil-like odor at ground surface
	45	S10	SS	1/2/2/5	dark grey SILT some v. fine sand	45.5-47.5 ft, rec 1.1



WESTON ENGINEERS CONSULTANTS

TEST BORING LOG
BORING NO. MW-4A

PROJECT: OPTION PROPERTIES- BURLINGTON, VERMONT | SHEET NO. 2 OF 2
CLIENT: CENTRAL VERMONT RAILWAY | JOB NO. 2715.02.01

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
2 inch 0.020 slot washed silica sand	45					borehole displaying plastic soil character
	50	S-11	SS	2/2/3/3	dark gray SILT some v. fine sand	50-52 FT, rec 2.0
					BOTTOM OF BOREHOLE	
Protective steel casing w/lock set in concrete	55					
	60					
	65					Water level in well measured above the ground surface
	70					
	75					S-1 and S-2 submitted for chemical analysis (VOC)
	80					
	85					
	90					
	95					

WESTON DESIGNERS CONSULTANTS

TEST BORING LOG

BORING NO. MW-4

PROJECT : OPTION PROPERTIES - BURLINGTON, VERMONT
SHEET NO. 1 OF 1
CLIENT : CENTRAL VERMONT RAILWAY
JOB NO. 2715-02-01
BORING CONTRACTOR : ADAMS ENGINEERING
ELEVATION
DATE STARTED 12/22/85
DATE FINISHED 12/23/85
DRILLER G. ADAMS
INSPECTOR C.J. CARLEO

GROUND WATER :

DATE	TIME	WATER EL.	SCREEN
12/24	2:00pm	6.37 btoc	

	CAS.	SAMP.	CORE	TUBE
TYPE				
DIA.				
WT.				
FALL				

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
6 inch nominal borehole bentonite pellets; 2 inch 0.020 slot PVC screen/riser; washed silica sand	0				crushed stone / coarse sand	
					black stained soil	oil-like odor
	5					
	10					NO SOIL SAMPLES COLLECTED
	15					
	20				BOTTOM OF BOREHOLE	
Protective steel casing w/lock set in concrete	25					
	30					
	35					
	40					
	45					

WESTON DESIGNERS CONSULTANTS

TEST BORING LOG
BORING NO. MW-5

PROJECT : OPTION PROPERTIES: BURLINGTON, VERMONT — SHEET NO. 1 OF 1
CLIENT : CENTRAL VERMONT RAILWAY — JOB NO.
BORING CONTRACTOR : ADAMS ENGINEERING — ELEVATION
DATE STARTED 12/24/85
DATE FINISHED 12/24/85
DRILLER G. ADAMS
INSPECTOR C.J. CARLEO

GROUND WATER :

DATE	TIME	WATER EL.	SCREEN
12/24	2:10PM	5.07 btoc	

	CAS.	SAMP.	CORE	TUBE
TYPE	Auger	SS		
DIA.	6 in			
WT.				
FALL				

WELL CONSTRUCTION	DEPTH FEET	SAMPLE NO.	SAMPLE TYPE	SAMPLE BLOWS PER 6 INCHES	CLASSIFICATION	REMARKS
	0					dry frozen
		S-1	SS	4/6	brown med SAND, some f&c sand, little gravel / cobbles	2.7-4.7 FT., rec 1.5
				6/6		moist
	5	S-2	SS	3/6	brown f-m SAND, trace cobbles	
				6/6	brown f-m SAND little silt	5.1-7.1 FT., rec 1.2
	10	S-3	SS	1/3	brown fine SAND little silt	10.7-12.7, rec. 1.5
				2/F		wet, no visible oil
	15	S-4	SS	5/11/16	brown SILT & fine SAND, clay lenses	15.2-16.7. rec. 1.5
					brown f-c SAND	
	20	S-5A			gravel (rock 1-2")	
		S-5B	SS	2/2/5/6	BOTTOM OF BOREHOLE	22.7-24.7
					dark grey SILT and CLAY	
	25					
	30					S-1 and S-2 submitted for chemical analyses (VOC)
	35					
	40				NOTE: "F" designates where split spoon penetrated with only the weight of the hammer	
					S-5A 19.7-21.7 2/3/3/3	
	45				took in split spoon no sample	

WELL CONSTRUCTION: 2 inch 0.020 slot PVC screen & riser; bentonite pellets; 2 inch washed silica sand; 6 inch nominal borehole; concrete surface seal; Protective steel casing w/lock set in concrete

APPENDIX A-2

MONITOR WELL SLUG TEST DATA

SLUG TEST ANALYSIS SUMMARY
PROJECT: CV-OPTION

BOUWER AND RICE (1976) EQUATION:

$K=(r^2/2L).(\ln(Re/R)).(\ln(Ho/Ht)/t)$

and: $\ln(Re/R)=1/((C/L/R)+(1.1/\ln(L/R)))$

where:
- K = hydraulic conductivity
- r = inner well radius
- R = borehole radius
- Re = effective well radius
- L = length of open interval
- C = dimensionless coefficient
- Ho = drawdown (or drawdown ratio) at time 0 (from straight-line plot)
- Ht = drawdown (or drawdown ratio) at time t (from straight-line plot)

WELL NUMBER	r INNER WELL RADIUS (FT)	R BORE-HOLE RADIUS (FT)	L OPEN INTERVAL LENGTH (FT)	L/R	C COEFFI-CIENT	ln(Re/R)	r2/2L	Ho (FT)	Ht (FT)	t (SECS)	ln(Ho/Ht) / t	K HYDRAULIC (FT/SEC)	K CONDUCTIVITY (FT/DAY)	K (CM/SEC)
MW1 FH	0.083	0.25	9	36.0	2.3	2.70	0.000382	10	1	114	2.020E-02	2.084E-05	1.80	6.353E-04
MW1 RH	0.083	0.25	9	36.0	2.3	2.70	0.000382	10	1	55	4.187E-02	4.321E-05	3.73	1.317E-03
MW1A FH	0.083	0.25	11	44.0	2.6	2.86	0.000313	10	1	8	2.878E-01	2.577E-04	22.26	7.854E-03
MW1A RH	0.083	0.25	11	44.0	2.6	2.86	0.000313	10	1	7	3.289E-01	2.945E-04	25.44	8.976E-03
MW2 FH	0.083	0.25	16	64.0	3.1	3.20	0.000215	10	1	12	1.919E-01	1.320E-04	11.41	4.024E-03
MW2 RH	0.083	0.25	16	64.0	3.1	3.20	0.000215	10	1	8	2.878E-01	1.980E-04	17.11	6.035E-03
MW4 FH	0.083	0.25	14	56.0	2.8	3.09	0.000246	10	1	10.5	2.193E-01	1.669E-04	14.42	5.087E-03
MW4 RH	0.083	0.25	14	56.0	2.8	3.09	0.000246	10	1	14	1.645E-01	1.252E-04	10.82	3.815E-03
MW4A RH	0.083	0.25	11	44.0	2.6	2.86	0.000313	10	1	678	3.396E-03	3.040E-06	0.26	9.267E-05
MW5 FH	0.083	0.25	15	60.0	2.9	3.15	0.000229	10	1	31	7.428E-02	5.381E-05	4.65	1.640E-03
MW5 RH	0.083	0.25	15	60.0	2.9	3.15	0.000229	10	1	31	7.428E-02	5.381E-05	4.65	1.640E-03

U.S. DEPT. OF THE NAVY METHOD
(NAVAL FACILITIES ENGINEERING COMMAND, 1974; IN CEDERGREN, 1977)

EQUATION:
$K=(r2/2L).(\ln(L/R)).(1/Dt)$

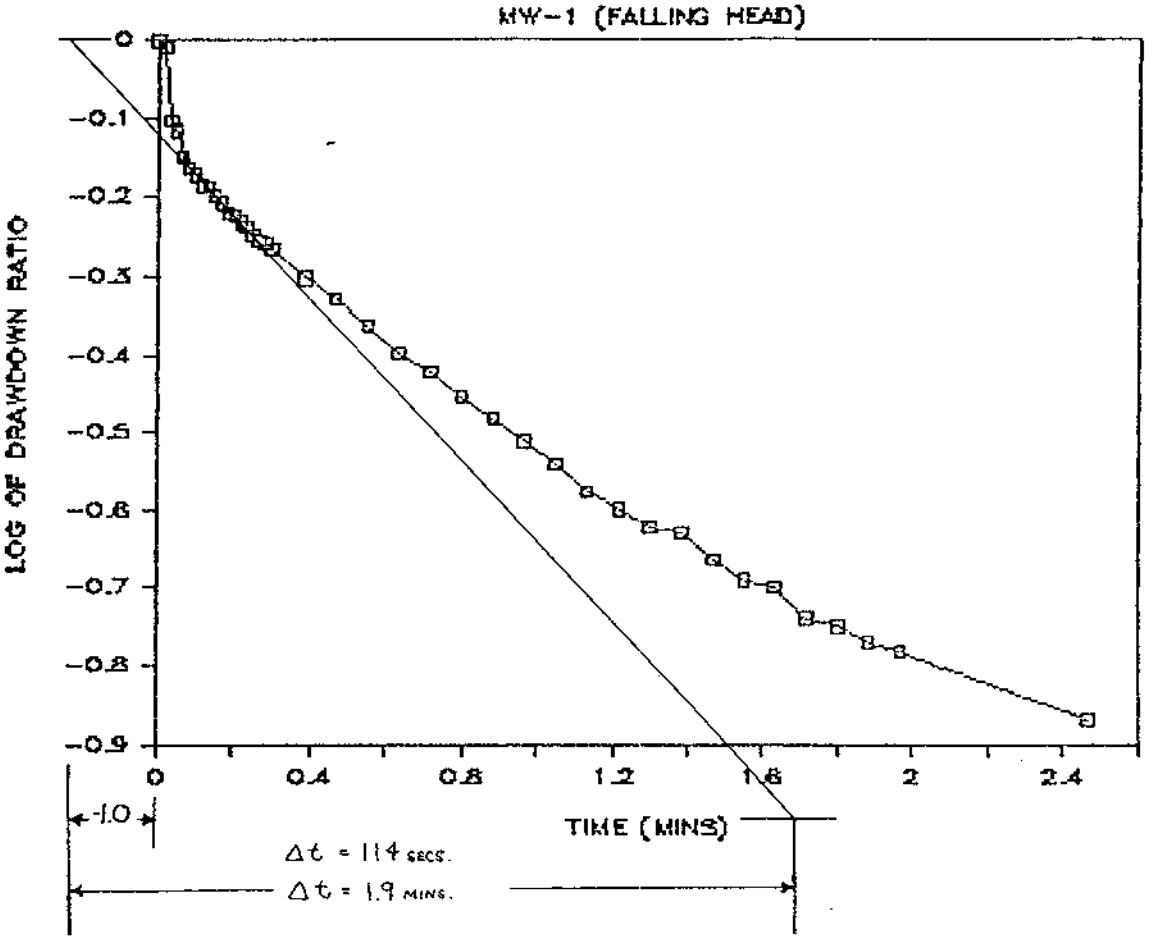
where: Dt= time difference over one log cycle
(diffence between time-axis intersects with the straight-line plot over one log cycle)

all other parameters defined as above

WELL NUMBER	r INNER WELL RADIUS (FT)	R BORE-HOLE RADIUS (FT)	L OPEN INTERVAL LENGTH (FT)	L/R	Dt (SECS)	r2/2L	K HYDRAULIC (FT/SEC)	K CONDUCTIVITY (FT/DAY)	K (CM/SEC)
MW1 FH	0.083	0.25	9	36.0	114	0.000382	1.20E-05	1.04	3.67E-04
MW1 RH	0.083	0.25	9	36.0	55	0.000382	2.49E-05	2.15	7.60E-04
MW1A FH	0.083	0.25	11	44.0	8	0.000313	1.48E-04	12.80	4.51E-03
MW1A RH	0.083	0.25	11	44.0	7	0.000313	1.69E-04	14.63	5.16E-03
MW2 FH	0.083	0.25	16	64.0	12	0.000215	7.46E-05	6.45	2.27E-03
MW2 RH	0.083	0.25	16	64.0	8	0.000215	1.12E-04	9.67	3.41E-03
MW4 FH	0.083	0.25	14	56.0	10.5	0.000246	9.43E-05	8.15	2.87E-03
MW4 RH	0.083	0.25	14	56.0	14	0.000246	7.07E-05	6.11	2.16E-03
MW4A RH	0.083	0.25	11	44.0	678	0.000313	1.75E-06	0.15	5.33E-05
MW5 FH	0.083	0.25	15	60.0	31	0.000229	3.03E-05	2.62	9.24E-04
MW5 RH	0.083	0.25	15	60.0	31	0.000229	3.03E-05	2.62	9.24E-04

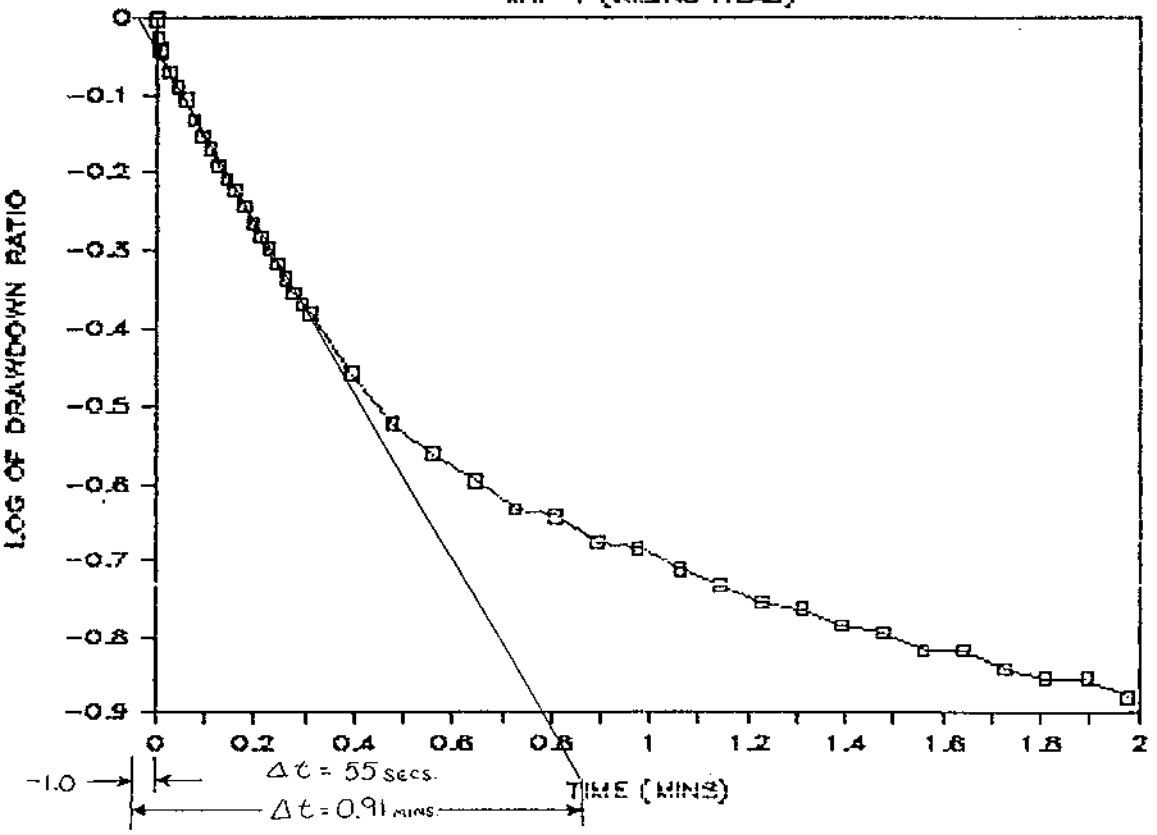
CV—OPTION

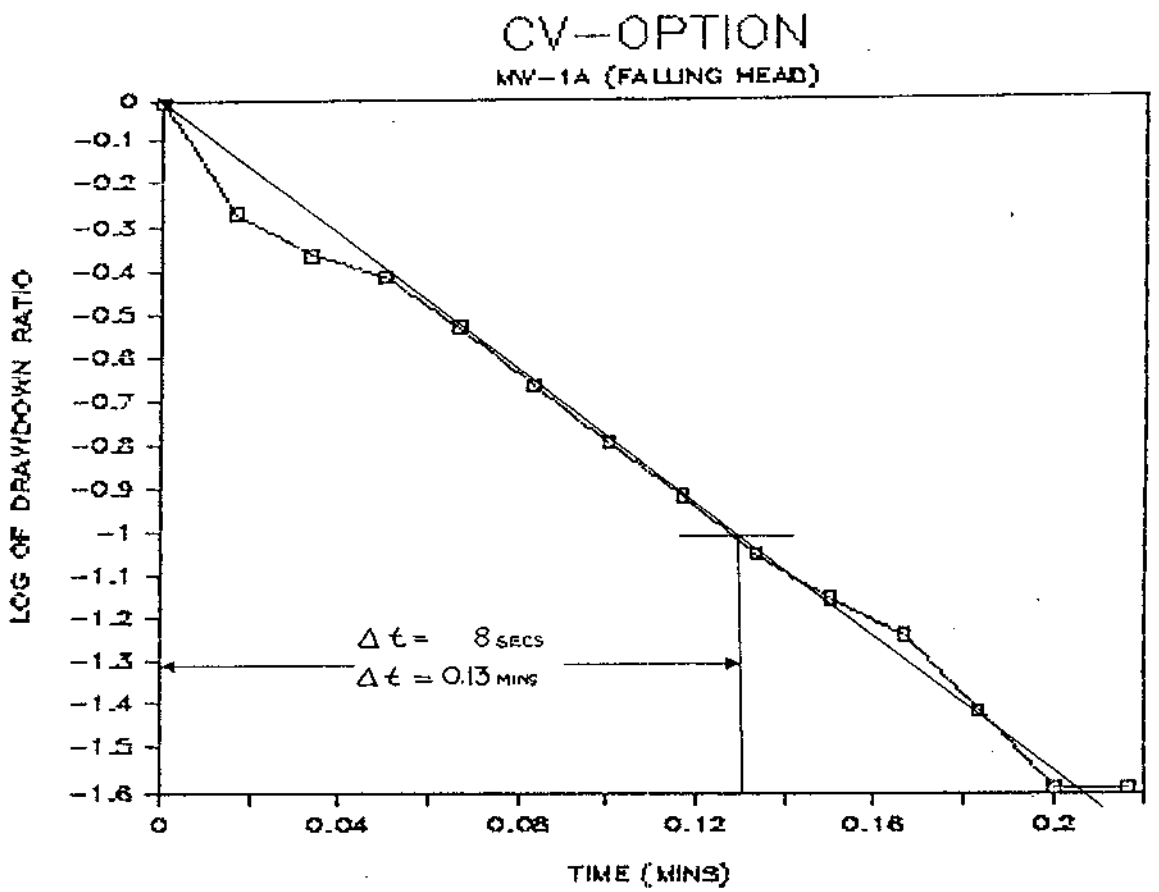
MW-1 (FALLING HEAD)

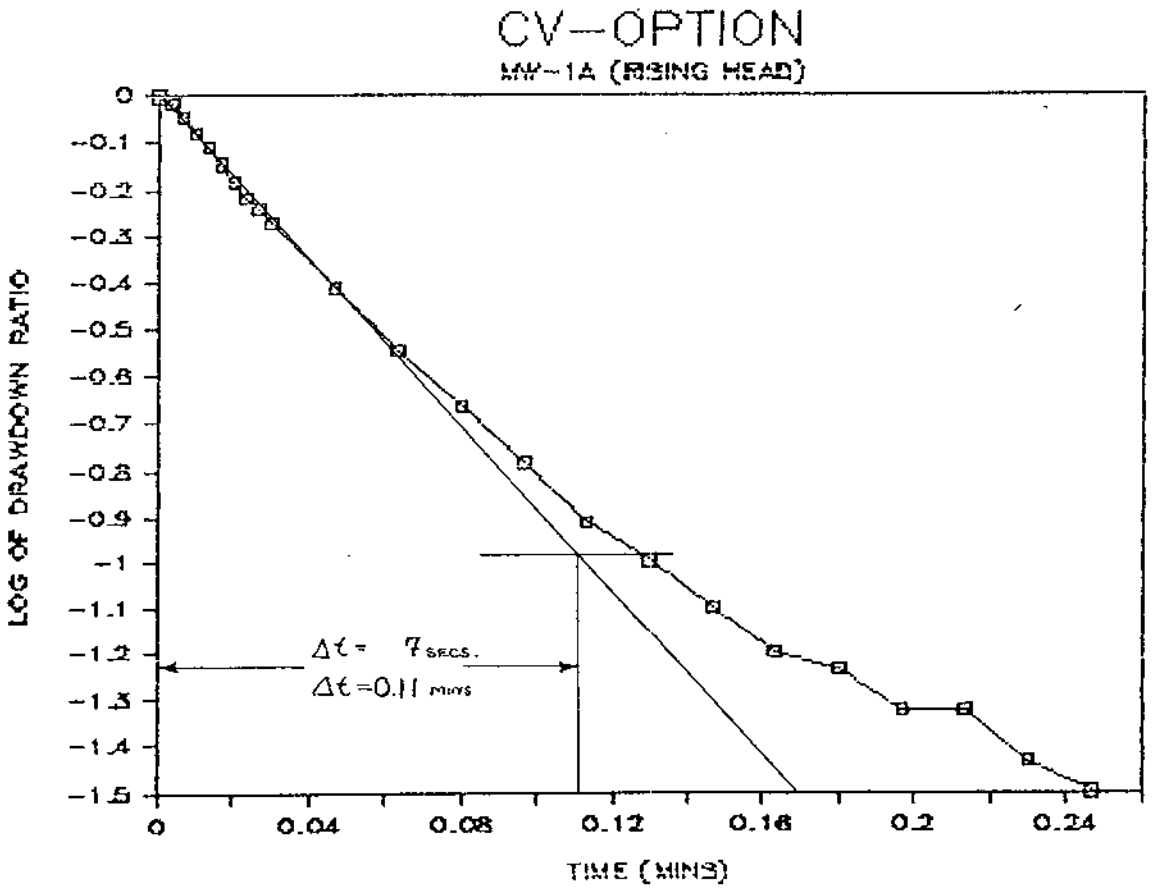


CV—OPTION

MW-1 (RISING HEAD)

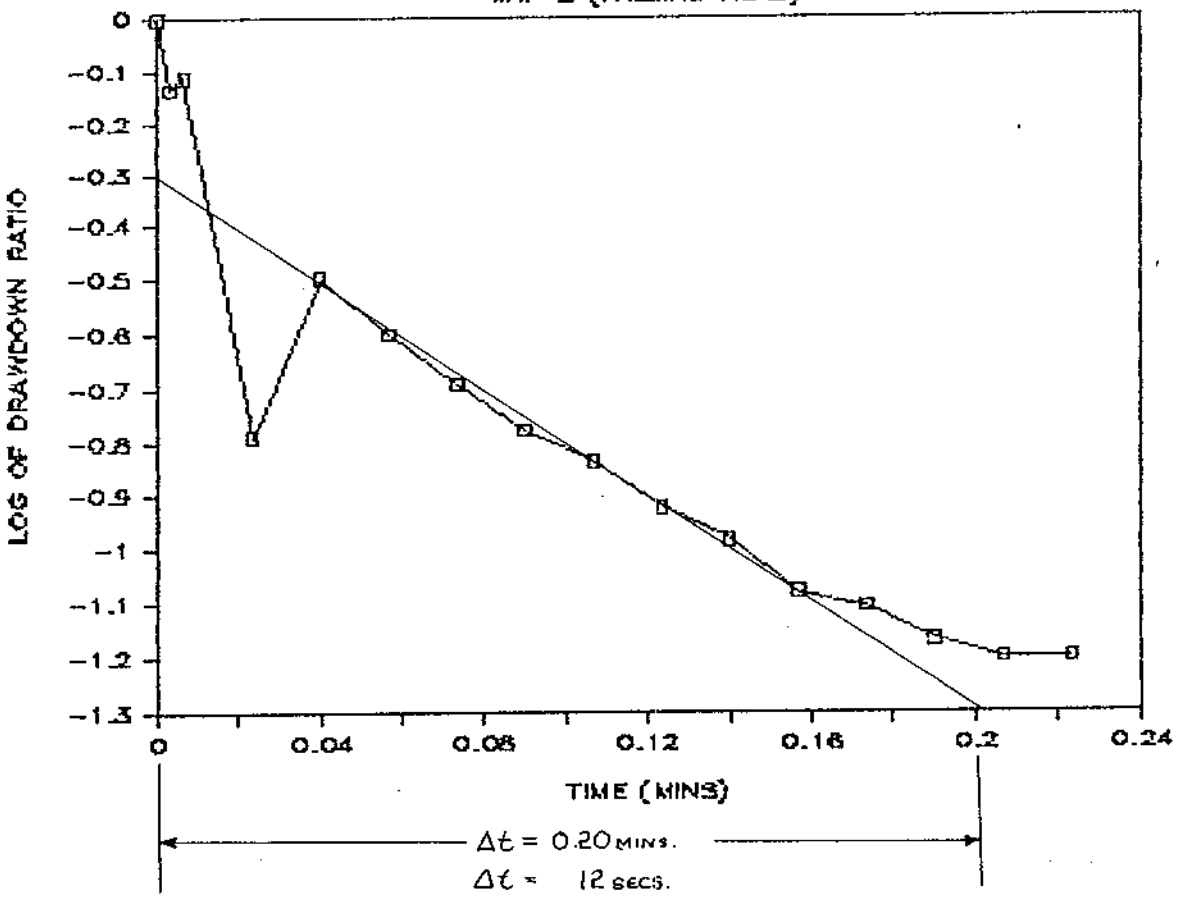



CV–OPTION
MW–1A (FALLING HEAD)
LOG OF DRAWDOWN RATIO
0
–0.1
–0.2
–0.3
–0.4
–0.5
–0.6
–0.7
–0.8
–0.9
–1
–1.1
–1.2
–1.3
–1.4
–1.5
–1.6
Δt = 8 SECS
Δt = 0.13 MINS
0
0.04
0.08
0.12
0.16
0.2
TIME (MINS)


CV–OPTION
MW–1A (RISING HEAD)
LOG OF DRAWDOWN RATIO
0
–0.1
–0.2
–0.3
–0.4
–0.5
–0.6
–0.7
–0.8
–0.9
–1
–1.1
–1.2
–1.3
–1.4
–1.5
Δt = 7 SECS.
Δt=0.11 MINS
0
0.04
0.08
0.12
0.16
0.2
0.24
TIME (MINS)

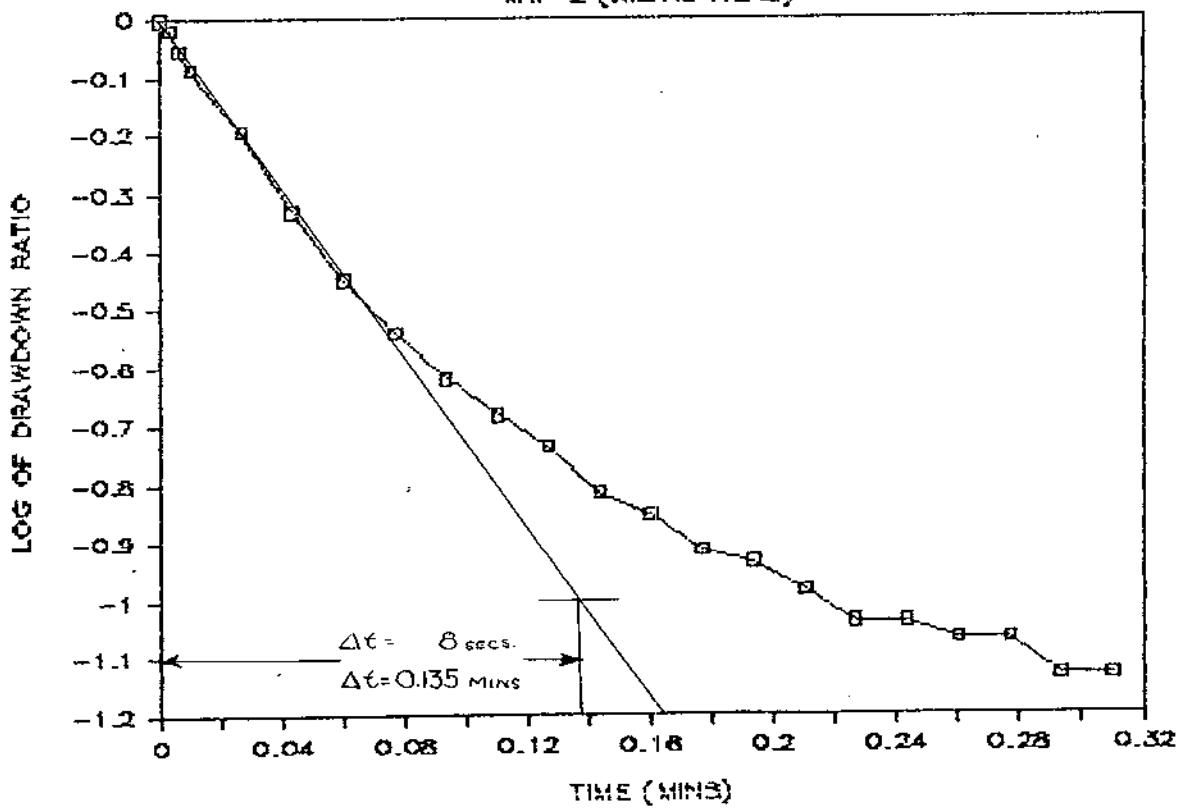
CV—OPTION

MW-2 (FALLING HEAD)



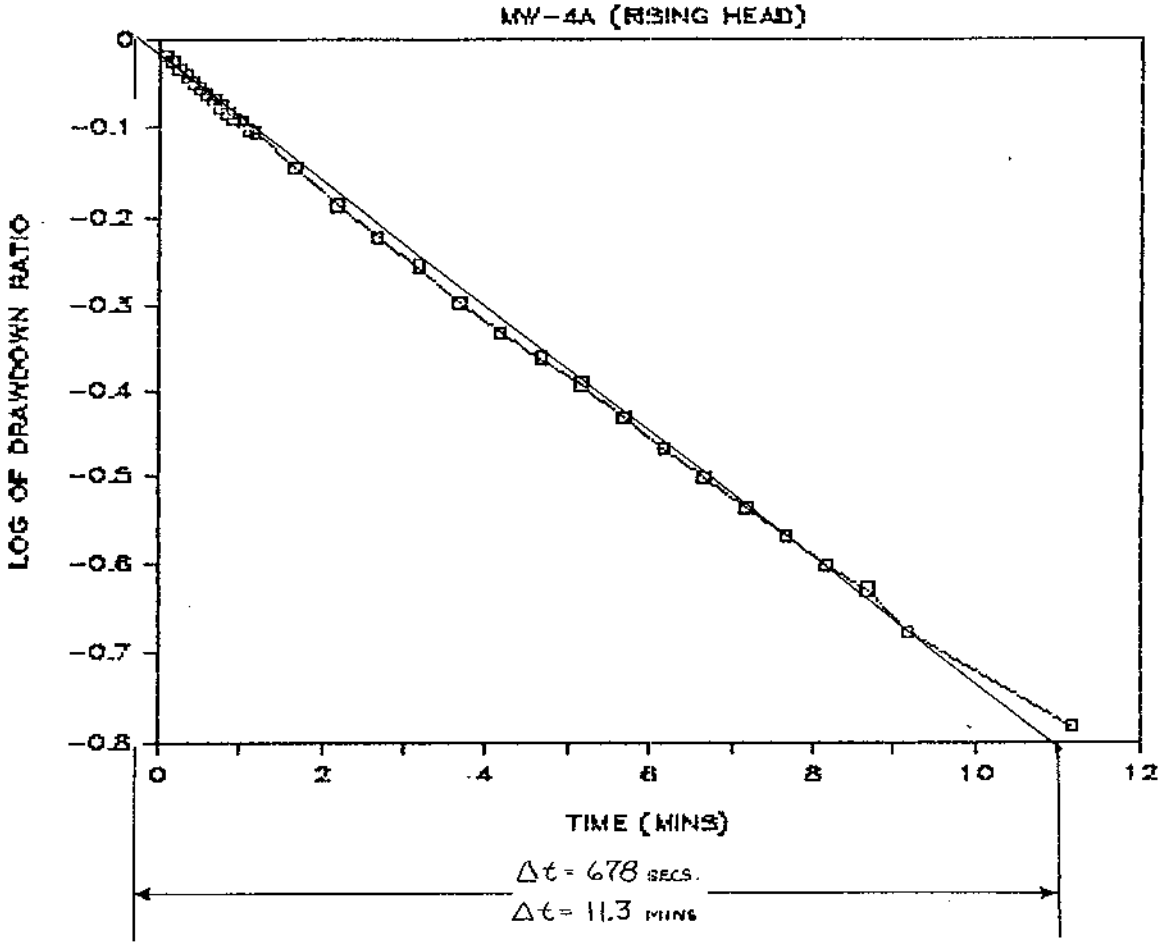
CV—OPTION

MW-2 (RISING HEAD)



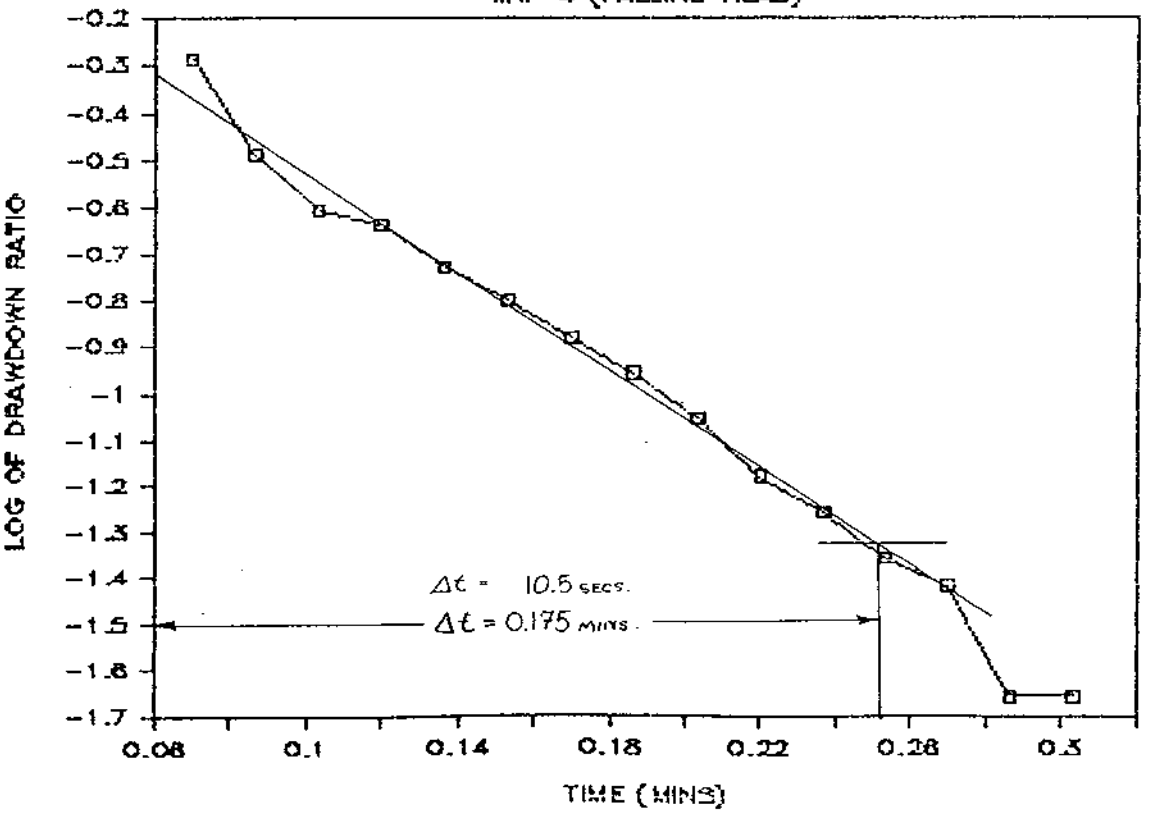
CV—OPTION

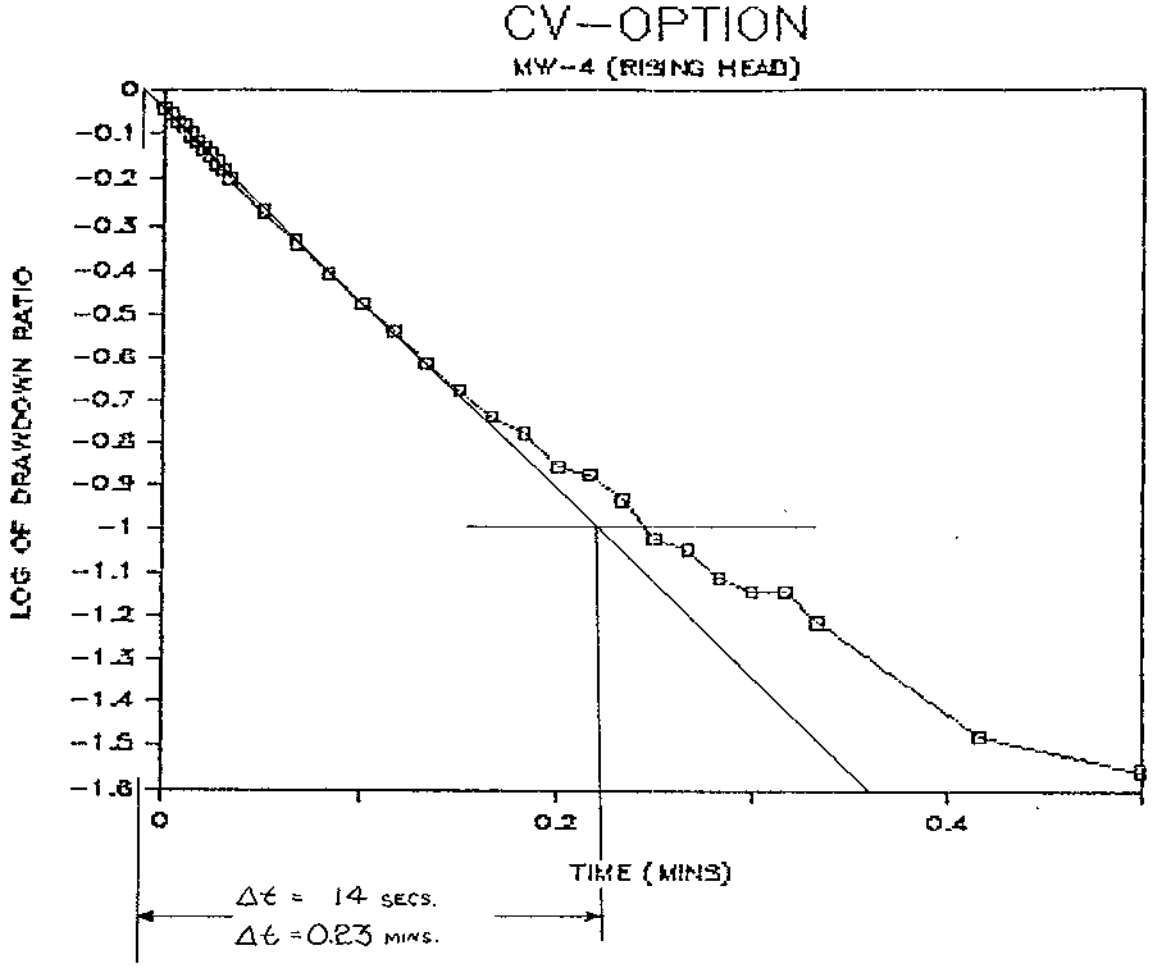
MW-4A (RISING HEAD)

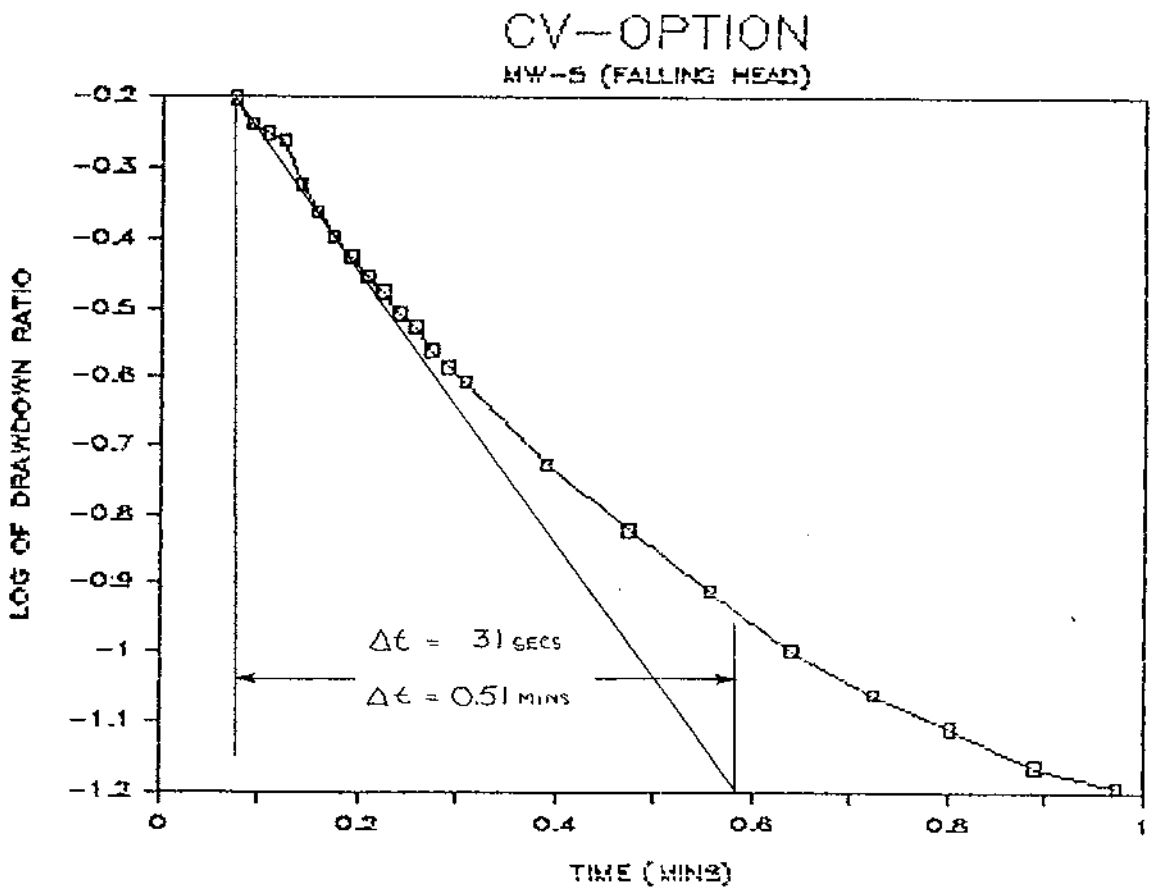


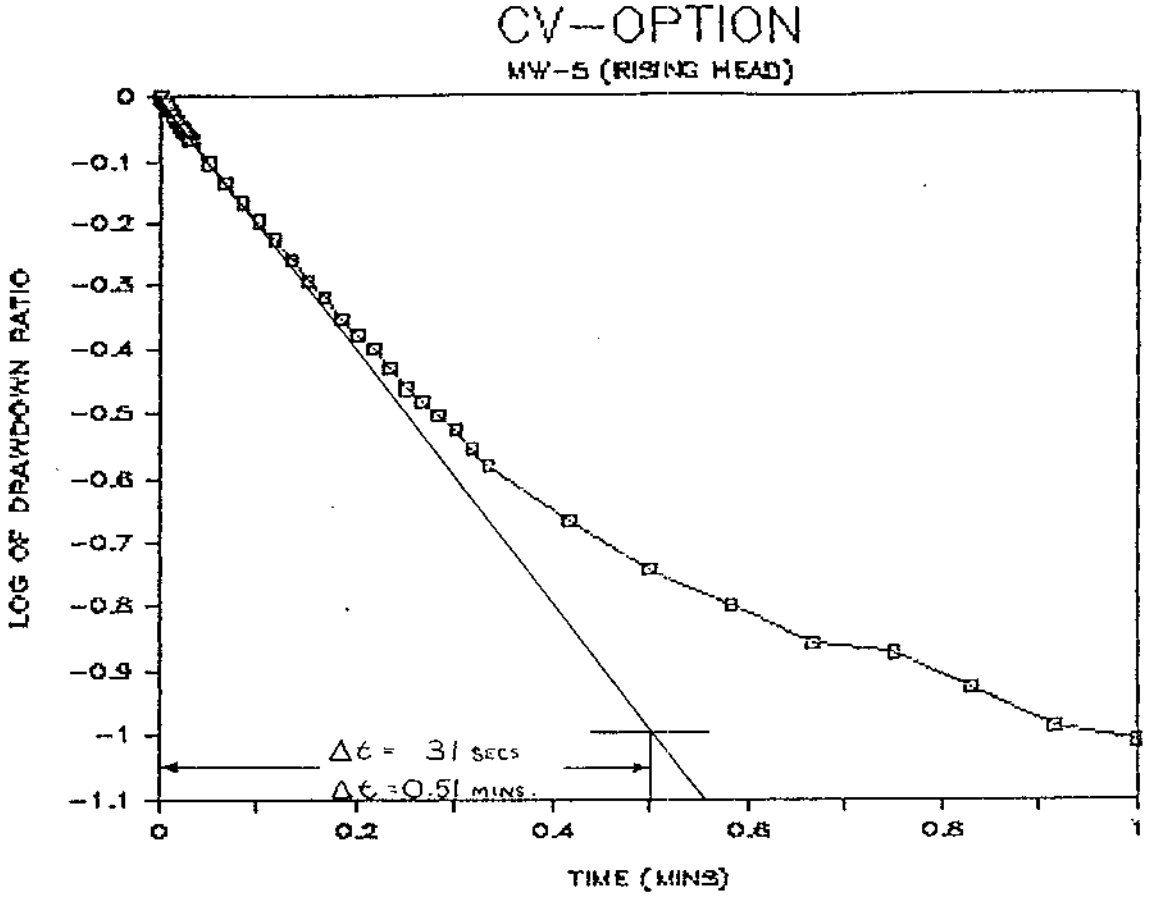
CV—OPTION

MW-4 (FALLING HEAD)




CV—OPTION
MW-4 (RISING HEAD)
LOG OF DRAWDOWN RATIO
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
-1.1
-1.2
-1.3
-1.4
-1.5
-1.6
0
0.2
0.4
TIME (MINS)
Δt = 14 secs.
Δt = 0.23 mins.


CV—OPTION
MW-5 (FALLING HEAD)
LOG OF DRAWDOWN RATIO
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
-1.1
-1.2
0
0.2
0.4
0.6
0.8
1
TIME (MINS)
Δt = 31 secs
Δt = 0.51 mins


CV-OPTION
MW-5 (RISING HEAD)
LOG OF DRAWDOWN RATIO
0
-0.1
-0.2
-0.3
-0.4
-0.5
-0.6
-0.7
-0.8
-0.9
-1
-1.1
Δt = 31 secs
Δt = 0.51 mins.
0
0.2
0.4
0.6
0.8
1
TIME (MINS)

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-1 (FALLING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	15
top of screen/open hole (from m.p.)	5
top of sandpack (from m.p.)	4
static water level (from m.p.)	6.25
length of tested interval (ft)	9
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	6.25
max. water level displacement (ft)	2.30

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.03	-0.03	0.92	0.40	-0.40
.00	0.03	-0.03	0.93	0.40	-0.39
0.01	0.03	-0.03	1.01	0.44	-0.36
0.01	0.03	-0.02	1.17	0.51	-0.29
0.01	0.03	-0.02	1.11	0.48	-0.32
0.02	0.03	-0.02	1.27	0.55	-0.26
0.02	0.03	-0.01	1.71	0.74	-0.13
0.02	0.03	-0.01	1.28	0.56	-0.25
0.03	0.03	-0.01	1.50	0.65	-0.19
0.03	0.03	.00	1.58	0.69	-0.16
0.03	0.03	0.00	2.30	1.00	0.00
0.05	0.03	0.02	2.25	0.98	-0.01
0.07	0.03	0.03	1.81	0.79	-0.10
0.08	0.03	0.05	1.76	0.77	-0.12
0.10	0.03	0.07	1.63	0.71	-0.15
0.12	0.03	0.08	1.58	0.69	-0.16
0.13	0.03	0.10	1.55	0.67	-0.17
0.15	0.03	0.12	1.50	0.65	-0.19
0.17	0.03	0.13	1.49	0.65	-0.19
0.18	0.03	0.15	1.46	0.63	-0.20
0.20	0.03	0.17	1.43	0.62	-0.21
0.22	0.03	0.18	1.39	0.60	-0.22
0.23	0.03	0.20	1.38	0.60	-0.22
0.25	0.03	0.22	1.35	0.59	-0.23
0.27	0.03	0.23	1.33	0.58	-0.24

0.28	0.03	0.25	1.30	0.57	-0.25
0.30	0.03	0.27	1.28	0.56	-0.25
0.32	0.03	0.28	1.27	0.55	-0.26
0.33	0.03	0.30	1.25	0.54	-0.26
0.42	0.03	0.38	1.15	0.50	-0.30
0.50	0.03	0.47	1.08	0.47	-0.33
0.58	0.03	0.55	1.00	0.43	-0.36
0.67	0.03	0.63	0.92	0.40	-0.40
0.75	0.03	0.72	0.87	0.38	-0.42
0.83	0.03	0.80	0.81	0.35	-0.45
0.92	0.03	0.88	0.76	0.33	-0.48
1.00	0.03	0.97	0.71	0.31	-0.51
1.08	0.03	1.05	0.66	0.29	-0.54
1.17	0.03	1.13	0.61	0.27	-0.58
1.25	0.03	1.22	0.58	0.25	-0.60
1.33	0.03	1.30	0.55	0.24	-0.62
1.42	0.03	1.38	0.54	0.23	-0.63
1.50	0.03	1.47	0.50	0.22	-0.66
1.58	0.03	1.55	0.47	0.20	-0.69
1.67	0.03	1.63	0.46	0.20	-0.70
1.75	0.03	1.72	0.42	0.18	-0.74
1.83	0.03	1.80	0.41	0.18	-0.75
1.92	0.03	1.88	0.39	0.17	-0.77
2.00	0.03	1.97	0.38	0.17	-0.78
2.50	0.03	2.47	0.31	0.13	-0.87
3.00	0.03	2.97	0.27	0.12	-0.93
3.50	0.03	3.47	0.23	0.10	-1.00
4.00	0.03	3.97	0.22	0.10	-1.02
4.50	0.03	4.47	0.23	0.10	-1.00
5.00	0.03	4.97	0.25	0.11	-0.96
5.50	0.03	5.47	0.25	0.11	-0.96
6.00	0.03	5.97	0.25	0.11	-0.96
6.50	0.03	6.47	0.23	0.10	-1.00
7.00	0.03	6.97	0.25	0.11	-0.96

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-1 (RISING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	15
top of screen/open hole (from m.p.)	5
top of sandpack (from m.p.)	4
static water level (from m.p.)	6.25
length of tested interval (ft)	9
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	6.25
max. water level displacement (ft)	2.36

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.02	-0.02	0.54	0.23	-0.64
.00	0.02	-0.02	0.90	0.38	-0.42
0.01	0.02	-0.02	1.62	0.69	-0.16
0.01	0.02	-0.01	0.69	0.29	-0.53
0.01	0.02	-0.01	1.58	0.67	-0.17
0.02	0.02	-0.01	1.97	0.83	-0.08
0.02	0.02	.00	2.03	0.86	-0.07
0.02	0.02	0.00	2.36	1.00	0.00
0.03	0.02	.00	2.24	0.95	-0.02
0.03	0.02	0.01	2.16	0.92	-0.04
0.03	0.02	0.01	2.14	0.91	-0.04
0.05	0.02	0.03	2.01	0.85	-0.07
0.07	0.02	0.04	1.93	0.82	-0.09
0.08	0.02	0.06	1.85	0.78	-0.11
0.10	0.02	0.08	1.74	0.74	-0.13
0.12	0.02	0.09	1.66	0.70	-0.15
0.13	0.02	0.11	1.60	0.68	-0.17
0.15	0.02	0.13	1.52	0.64	-0.19
0.17	0.02	0.14	1.46	0.62	-0.21
0.18	0.02	0.16	1.41	0.60	-0.22
0.20	0.02	0.18	1.35	0.57	-0.24
0.22	0.02	0.19	1.28	0.54	-0.27
0.23	0.02	0.21	1.23	0.52	-0.28
0.25	0.02	0.23	1.19	0.50	-0.30
0.27	0.02	0.24	1.14	0.48	-0.32

0.28	0.02	0.26
0.30	0.02	0.28
0.32	0.02	0.29
0.33	0.02	0.31
0.42	0.02	0.39
0.50	0.02	0.48
0.58	0.02	0.56
0.67	0.02	0.64
0.75	0.02	0.73
0.83	0.02	0.81
0.92	0.02	0.89
1.00	0.02	0.98
1.08	0.02	1.06
1.17	0.02	1.14
1.25	0.02	1.23
1.33	0.02	1.31
1.42	0.02	1.39
1.50	0.02	1.48
1.58	0.02	1.56
1.67	0.02	1.64
1.75	0.02	1.73
1.83	0.02	1.81
1.92	0.02	1.89
2.00	0.02	1.98
2.50	0.02	2.48
3.00	0.02	2.98
3.50	0.02	3.48
4.00	0.02	3.98
4.50	0.02	4.48
5.00	0.02	4.98
5.50	0.02	5.48
6.00	0.02	5.98
6.50	0.02	6.48
7.00	0.02	6.98

1.09	0.46	-0.34
1.04	0.44	-0.36
1.01	0.43	-0.37
0.98	0.42	-0.38
0.82	0.35	-0.46
0.71	0.30	-0.52
0.65	0.28	-0.56
0.60	0.25	-0.59
0.55	0.23	-0.63
0.54	0.23	-0.64
0.50	0.21	-0.67
0.49	0.21	-0.68
0.46	0.19	-0.71
0.44	0.19	-0.73
0.42	0.18	-0.75
0.41	0.17	-0.76
0.39	0.17	-0.78
0.38	0.16	-0.79
0.36	0.15	-0.82
0.36	0.15	-0.82
0.34	0.14	-0.84
0.33	0.14	-0.85
0.33	0.14	-0.85
0.31	0.13	-0.88
0.27	0.11	-0.94
0.23	0.10	-1.01
0.20	0.08	-1.07
0.19	0.08	-1.09
0.15	0.06	-1.20
0.14	0.06	-1.23
0.12	0.05	-1.29
0.11	0.05	-1.33
0.09	0.04	-1.42
0.07	0.03	-1.53

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-1A (FALLING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	36
top of screen/open hole (from m.p.)	26
top of sandpack (from m.p.)	25
static water level (from m.p.)	6.90
length of tested interval (ft)	11
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	6.90
max. water level displacement (ft)	1.56

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.03	-0.03	0.00	0.00	ERR
.00	0.03	-0.03	0.20	0.13	-0.89
0.01	0.03	-0.03	0.19	0.12	-0.91
0.01	0.03	-0.02	0.36	0.23	-0.64
0.01	0.03	-0.02	0.46	0.29	-0.53
0.02	0.03	-0.02	0.80	0.51	-0.29
0.02	0.03	-0.01	0.81	0.52	-0.28
0.02	0.03	-0.01	1.18	0.76	-0.12
0.03	0.03	-0.01	1.42	0.91	-0.04
0.03	0.03	.00	1.56	1.00	0.00
0.03	0.03	0.00	1.54	0.99	-0.01
0.05	0.03	0.02	0.84	0.54	-0.27
0.07	0.03	0.03	0.67	0.43	-0.37
0.08	0.03	0.05	0.60	0.38	-0.41
0.10	0.03	0.07	0.46	0.29	-0.53
0.12	0.03	0.08	0.34	0.22	-0.66
0.13	0.03	0.10	0.25	0.16	-0.80
0.15	0.03	0.12	0.19	0.12	-0.91
0.17	0.03	0.13	0.14	0.09	-1.05
0.18	0.03	0.15	0.11	0.07	-1.15
0.20	0.03	0.17	0.09	0.06	-1.24
0.22	0.03	0.18	0.06	0.04	-1.41
0.23	0.03	0.20	0.04	0.03	-1.59
0.25	0.03	0.22	0.04	0.03	-1.59
0.27	0.03	0.23	0.03	0.02	-1.72

0.28	0.03	0.25	0.03	0.02	-1.72
0.30	0.03	0.27	0.03	0.02	-1.72
0.32	0.03	0.28	0.01	0.01	-2.19
0.33	0.03	0.30	0.01	0.01	-2.19
0.42	0.03	0.38	0.01	0.01	-2.19
0.50	0.03	0.47	0.01	0.01	-2.19
0.58	0.03	0.55	0.01	0.01	-2.19
0.67	0.03	0.63	0.01	0.01	-2.19
0.75	0.03	0.72	0.01	0.01	-2.19
0.83	0.03	0.80	0.03	0.02	-1.72
0.92	0.03	0.88	0.03	0.02	-1.72
1.00	0.03	0.97	0.03	0.02	-1.72
1.08	0.03	1.05	0.03	0.02	-1.72
1.17	0.03	1.13	0.03	0.02	-1.72
1.25	0.03	1.22	0.03	0.02	-1.72
1.33	0.03	1.30	0.03	0.02	-1.72
1.42	0.03	1.38	0.03	0.02	-1.72
1.50	0.03	1.47	0.03	0.02	-1.72
1.58	0.03	1.55	0.03	0.02	-1.72
1.67	0.03	1.63	0.03	0.02	-1.72
1.75	0.03	1.72	0.03	0.02	-1.72
1.83	0.03	1.80	0.03	0.02	-1.72
1.92	0.03	1.88	0.01	0.01	-2.19
2.00	0.03	1.97	0.01	0.01	-2.19
2.50	0.03	2.47	0.01	0.01	-2.19
3.00	0.03	2.97	0.00	0.00	ERR
3.50	0.03	3.47	0.01	0.01	-2.19

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-1A (RISING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	36
top of screen/open hole (from m.p.)	26
top of sandpack (from m.p.)	25
static water level (from m.p.)	6.90
length of tested interval (ft)	11
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	6.90
max. water level displacement (ft)	1.89

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	.00	.00	1.60	0.85	-0.07
.00	.00	0.00	1.89	1.00	0.00
0.01	.00	.00	1.82	0.96	-0.02
0.01	.00	0.01	1.70	0.90	-0.05
0.01	.00	0.01	1.57	0.83	-0.08
0.02	.00	0.01	1.47	0.78	-0.11
0.02	.00	0.02	1.35	0.71	-0.15
0.02	.00	0.02	1.23	0.65	-0.19
0.03	.00	0.02	1.14	0.60	-0.22
0.03	.00	0.03	1.08	0.57	-0.24
0.03	.00	0.03	1.01	0.53	-0.27
0.05	.00	0.05	0.73	0.39	-0.41
0.07	.00	0.06	0.54	0.29	-0.54
0.08	.00	0.08	0.41	0.22	-0.66
0.10	.00	0.10	0.31	0.16	-0.79
0.12	.00	0.11	0.23	0.12	-0.91
0.13	.00	0.13	0.19	0.10	-1.00
0.15	.00	0.15	0.15	0.08	-1.10
0.17	.00	0.16	0.12	0.06	-1.20
0.18	.00	0.18	0.11	0.06	-1.24
0.20	.00	0.20	0.09	0.05	-1.32
0.22	.00	0.21	0.09	0.05	-1.32
0.23	.00	0.23	0.07	0.04	-1.43
0.25	.00	0.25	0.06	0.03	-1.50
0.27	.00	0.26	0.06	0.03	-1.50

0.28	.00	0.28	0.06	0.03	-1.50
0.30	.00	0.30	0.06	0.03	-1.50
0.32	.00	0.31	0.06	0.03	-1.50
0.33	.00	0.33	0.06	0.03	-1.50
0.42	.00	0.41	0.04	0.02	-1.67
0.50	.00	0.50	0.04	0.02	-1.67
0.58	.00	0.58	0.03	0.02	-1.80
0.67	.00	0.66	0.03	0.02	-1.80
0.75	.00	0.75	0.03	0.02	-1.80
0.83	.00	0.83	0.03	0.02	-1.80
0.92	.00	0.91	0.03	0.02	-1.80
1.00	.00	1.00	0.03	0.02	-1.80
1.08	.00	1.08	0.03	0.02	-1.80
1.17	.00	1.16	0.03	0.02	-1.80
1.25	.00	1.25	0.03	0.02	-1.80
1.33	.00	1.33	0.03	0.02	-1.80
1.42	.00	1.41	0.03	0.02	-1.80
1.50	.00	1.50	0.03	0.02	-1.80
1.58	.00	1.58	0.03	0.02	-1.80
1.67	.00	1.66	0.01	0.01	-2.28
1.75	.00	1.75	0.01	0.01	-2.28
1.83	.00	1.83	0.01	0.01	-2.28
1.92	.00	1.91	0.01	0.01	-2.28
2.00	.00	2.00	0.01	0.01	-2.28
2.50	.00	2.50	0.01	0.01	-2.28
3.00	.00	3.00	0.01	0.01	-2.28
3.50	.00	3.50	0.01	0.01	-2.28

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-2 (FALLING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	21
top of screen/open hole (from m.p.)	6
top of sandpack (from m.p.)	4
static water level (from m.p.)	4.59
length of tested interval (ft)	16
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	4.59
max. water level displacement (ft)	1.91

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.03	-0.03	1.53	0.80	-0.10
.00	0.03	-0.02	1.51	0.79	-0.10
0.01	0.03	-0.02	1.23	0.64	-0.19
0.01	0.03	-0.02	1.47	0.77	-0.11
0.01	0.03	-0.01	1.32	0.69	-0.16
0.02	0.03	-0.01	0.93	0.49	-0.31
0.02	0.03	-0.01	1.26	0.66	-0.18
0.02	0.03	.00	1.75	0.92	-0.04
0.03	0.03	0.00	1.91	1.00	.00
0.03	0.03	.00	1.40	0.73	-0.13
0.03	0.03	0.01	1.48	0.77	-0.11
0.05	0.03	0.02	0.31	0.16	-0.79
0.07	0.03	0.04	0.61	0.32	-0.50
0.08	0.03	0.06	0.48	0.25	-0.60
0.10	0.03	0.07	0.39	0.20	-0.69
0.12	0.03	0.09	0.32	0.17	-0.78
0.13	0.03	0.11	0.28	0.15	-0.83
0.15	0.03	0.12	0.23	0.12	-0.92
0.17	0.03	0.14	0.20	0.10	-0.98
0.18	0.03	0.16	0.16	0.08	-1.08
0.20	0.03	0.17	0.15	0.08	-1.10
0.22	0.03	0.19	0.13	0.07	-1.17
0.23	0.03	0.21	0.12	0.06	-1.20
0.25	0.03	0.22	0.12	0.06	-1.20
0.27	0.03	0.24	0.10	0.05	-1.28

0.28	0.03	0.26	0.08	0.04	-1.38
0.30	0.03	0.27	0.08	0.04	-1.38
0.32	0.03	0.29	0.08	0.04	-1.38
0.33	0.03	0.31	0.07	0.04	-1.44
0.42	0.03	0.39	0.07	0.04	-1.44
0.50	0.03	0.47	0.05	0.03	-1.58
0.58	0.03	0.56	0.05	0.03	-1.58
0.67	0.03	0.64	0.05	0.03	-1.58
0.75	0.03	0.72	0.07	0.04	-1.44
0.83	0.03	0.80	0.07	0.04	-1.44
0.92	0.03	0.89	0.07	0.04	-1.44
1.00	0.03	0.97	0.07	0.04	-1.44
1.08	0.03	1.06	0.07	0.04	-1.44
1.17	0.03	1.14	0.07	0.04	-1.44
1.25	0.03	1.22	0.07	0.04	-1.44
1.33	0.03	1.31	0.07	0.04	-1.44
1.42	0.03	1.39	0.07	0.04	-1.44
1.50	0.03	1.47	0.07	0.04	-1.44
1.58	0.03	1.56	0.07	0.04	-1.44
1.67	0.03	1.64	0.07	0.04	-1.44
1.75	0.03	1.72	0.07	0.04	-1.44
1.83	0.03	1.81	0.07	0.04	-1.44
1.92	0.03	1.89	0.07	0.04	-1.44
2.00	0.03	1.97	0.07	0.04	-1.44
2.50	0.03	2.47	0.07	0.04	-1.44
3.00	0.03	2.97	0.07	0.04	-1.44
3.50	0.03	3.47	0.07	0.04	-1.44

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-2 (RISING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	21
top of screen/open hole (from m.p.)	6
top of sandpack (from m.p.)	4
static water level (from m.p.)	4.59
length of tested interval (ft)	16
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	4.59
max. water level displacement (ft)	1.63

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.02	-0.02	0.20	0.12	-0.91
.00	0.02	-0.02	0.77	0.47	-0.33
0.01	0.02	-0.02	1.00	0.61	-0.21
0.01	0.02	-0.01	1.08	0.66	-0.18
0.01	0.02	-0.01	1.33	0.82	-0.09
0.02	0.02	-0.01	1.47	0.90	-0.04
0.02	0.02	.00	1.57	0.96	-0.02
0.02	0.02	0.00	1.63	1.00	.00
0.03	0.02	.00	1.57	0.96	-0.02
0.03	0.02	0.01	1.44	0.88	-0.05
0.03	0.02	0.01	1.33	0.82	-0.09
0.05	0.02	0.03	1.04	0.64	-0.20
0.07	0.02	0.04	0.76	0.47	-0.33
0.08	0.02	0.06	0.58	0.36	-0.45
0.10	0.02	0.08	0.47	0.29	-0.54
0.12	0.02	0.09	0.39	0.24	-0.62
0.13	0.02	0.11	0.34	0.21	-0.68
0.15	0.02	0.13	0.30	0.18	-0.74
0.17	0.02	0.14	0.25	0.15	-0.81
0.18	0.02	0.16	0.23	0.14	-0.85
0.20	0.02	0.18	0.20	0.12	-0.91
0.22	0.02	0.19	0.19	0.12	-0.93
0.23	0.02	0.21	0.17	0.10	-0.98
0.25	0.02	0.23	0.15	0.09	-1.04
0.27	0.02	0.24	0.15	0.09	-1.04

0.28	0.02	0.26	0.14	0.09	-1.07
0.30	0.02	0.28	0.14	0.09	-1.07
0.32	0.02	0.29	0.12	0.07	-1.13
0.33	0.02	0.31	0.12	0.07	-1.13
0.42	0.02	0.39	0.09	0.06	-1.26
0.50	0.02	0.48	0.09	0.06	-1.26
0.58	0.02	0.56	0.09	0.06	-1.26
0.67	0.02	0.64	0.07	0.04	-1.37
0.75	0.02	0.73	0.06	0.04	-1.43
0.83	0.02	0.81	0.06	0.04	-1.43
0.92	0.02	0.89	0.06	0.04	-1.43
1.00	0.02	0.98	0.04	0.02	-1.61
1.08	0.02	1.06	0.03	0.02	-1.74
1.17	0.02	1.14	0.03	0.02	-1.74
1.25	0.02	1.23	0.03	0.02	-1.74
1.33	0.02	1.31	0.03	0.02	-1.74
1.42	0.02	1.39	0.03	0.02	-1.74
1.50	0.02	1.48	0.03	0.02	-1.74
1.58	0.02	1.56	0.03	0.02	-1.74
1.67	0.02	1.64	0.03	0.02	-1.74
1.75	0.02	1.73	0.03	0.02	-1.74
1.83	0.02	1.81	0.01	0.01	-2.21
1.92	0.02	1.89	0.01	0.01	-2.21
2.00	0.02	1.98	0.01	0.01	-2.21
2.50	0.02	2.48	0.00	0.00	ERR
3.00	0.02	2.98	0.00	0.00	ERR
3.50	0.02	3.48	0.00	0.00	ERR

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-4 (FALLING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	20
top of screen/open hole (from m.p.)	5
top of sandpack (from m.p.)	4
static water level (from m.p.)	6.32
length of tested interval (ft)	14
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	6.32
max. water level displacement (ft)	1.82

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.03	-0.03	0.69	0.38	-0.42
.00	0.03	-0.03	1.01	0.55	-0.26
0.01	0.03	-0.02	1.15	0.63	-0.20
0.01	0.03	-0.02	1.23	0.68	-0.17
0.01	0.03	-0.02	1.31	0.72	-0.14
0.02	0.03	-0.01	1.50	0.82	-0.08
0.02	0.03	-0.01	1.42	0.78	-0.11
0.02	0.03	-0.01	1.47	0.81	-0.09
0.03	0.03	.00	1.56	0.86	-0.07
0.03	0.03	0.00	1.82	1.00	.00
0.03	0.03	.00	1.74	0.96	-0.02
0.05	0.03	0.02	1.53	0.84	-0.08
0.07	0.03	0.04	0.43	0.24	-0.63
0.08	0.03	0.05	0.34	0.19	-0.73
0.10	0.03	0.07	0.94	0.52	-0.29
0.12	0.03	0.09	0.59	0.32	-0.49
0.13	0.03	0.10	0.45	0.25	-0.61
0.15	0.03	0.12	0.42	0.23	-0.64
0.17	0.03	0.14	0.34	0.19	-0.73
0.18	0.03	0.15	0.29	0.16	-0.80
0.20	0.03	0.17	0.24	0.13	-0.88
0.22	0.03	0.19	0.20	0.11	-0.96
0.23	0.03	0.20	0.16	0.09	-1.06
0.25	0.03	0.22	0.12	0.07	-1.18
0.27	0.03	0.24	0.10	0.05	-1.26

0.28	0.03	0.25
0.30	0.03	0.27
0.32	0.03	0.29
0.33	0.03	0.30
0.42	0.03	0.39
0.50	0.03	0.47
0.58	0.03	0.55
0.67	0.03	0.64
0.75	0.03	0.72
0.83	0.03	0.80
0.92	0.03	0.89
1.00	0.03	0.97
1.08	0.03	1.05
1.17	0.03	1.14
1.25	0.03	1.22
1.33	0.03	1.30
1.42	0.03	1.39
1.50	0.03	1.47
1.58	0.03	1.55
1.67	0.03	1.64
1.75	0.03	1.72
1.83	0.03	1.80
1.92	0.03	1.89
2.00	0.03	1.97
2.50	0.03	2.47
3.00	0.03	2.97
3.50	0.03	3.47

0.08	0.04	-1.36
0.07	0.04	-1.41
0.04	0.02	-1.66
0.04	0.02	-1.66
-0.01	-0.01	ERR
-0.01	-0.01	ERR
-0.01	-0.01	ERR
-0.01	-0.01	ERR
-0.01	-0.01	ERR
0.00	0.00	ERR
0.00	0.00	ERR
0.02	0.01	-1.96
0.04	0.02	-1.66
0.04	0.02	-1.66
0.04	0.02	-1.66
0.05	0.03	-1.56
0.05	0.03	-1.56
0.05	0.03	-1.56
0.07	0.04	-1.41
0.07	0.04	-1.41
0.05	0.03	-1.56
0.07	0.04	-1.41
0.07	0.04	-1.41
0.07	0.04	-1.41
0.08	0.04	-1.36
0.08	0.04	-1.36
0.07	0.04	-1.41

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-4 (RISING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	20
top of screen/open hole (from m.p.)	5
top of sandpack (from m.p.)	4
static water level (from m.p.)	6.32
length of tested interval (ft)	14
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	6.32
max. water level displacement (ft)	1.80

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.00	0.00	1.64	0.91	-0.04
.00	0.00	.00	1.59	0.88	-0.05
0.01	0.00	0.01	1.53	0.85	-0.07
0.01	0.00	0.01	1.49	0.83	-0.08
0.01	0.00	0.01	1.43	0.79	-0.10
0.02	0.00	0.02	1.38	0.77	-0.12
0.02	0.00	0.02	1.33	0.74	-0.13
0.02	0.00	0.02	1.29	0.72	-0.14
0.03	0.00	0.03	1.24	0.69	-0.16
0.03	0.00	0.03	1.19	0.66	-0.18
0.03	0.00	0.03	1.14	0.63	-0.20
0.05	0.00	0.05	0.97	0.54	-0.27
0.07	0.00	0.07	0.83	0.46	-0.34
0.08	0.00	0.08	0.70	0.39	-0.41
0.10	0.00	0.10	0.60	0.33	-0.48
0.12	0.00	0.12	0.52	0.29	-0.54
0.13	0.00	0.13	0.44	0.24	-0.61
0.15	0.00	0.15	0.38	0.21	-0.68
0.17	0.00	0.17	0.33	0.18	-0.74
0.18	0.00	0.18	0.30	0.17	-0.78
0.20	0.00	0.20	0.25	0.14	-0.86
0.22	0.00	0.22	0.24	0.13	-0.88
0.23	0.00	0.23	0.21	0.12	-0.93
0.25	0.00	0.25	0.17	0.09	-1.02
0.27	0.00	0.27	0.16	0.09	-1.05

0.28	0.00	0.28
0.30	0.00	0.30
0.32	0.00	0.32
0.33	0.00	0.33
0.42	0.00	0.42
0.50	0.00	0.50
0.58	0.00	0.58
0.67	0.00	0.67
0.75	0.00	0.75
0.83	0.00	0.83
0.92	0.00	0.92
1.00	0.00	1.00
1.08	0.00	1.08
1.17	0.00	1.17
1.25	0.00	1.25
1.33	0.00	1.33
1.42	0.00	1.42
1.50	0.00	1.50
1.58	0.00	1.58
1.67	0.00	1.67
1.75	0.00	1.75
1.83	0.00	1.83
1.92	0.00	1.92
2.00	0.00	2.00
2.50	0.00	2.50
3.00	0.00	3.00
3.50	0.00	3.50

0.14	0.08	-1.11
0.13	0.07	-1.14
0.13	0.07	-1.14
0.11	0.06	-1.21
0.06	0.03	-1.48
0.05	0.03	-1.56
0.05	0.03	-1.56
0.03	0.02	-1.78
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.02	0.01	-1.95
0.00	0.00	ERR
0.02	0.01	-1.95
0.02	0.01	-1.95
0.00	0.00	ERR
0.00	0.00	ERR
0.00	0.00	ERR
0.00	0.00	ERR
0.00	0.00	ERR
0.00	0.00	ERR

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-4A (RISING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	53
top of screen/open hole (from m.p.)	43
top of sandpack (from m.p.)	42
static water level (from m.p.)	1.10
length of tested interval (ft)	11
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	1.10
max. water level displacement (ft)	2.00

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.42	0.83	-0.42	0.07	0.04	-1.46
0.50	0.83	-0.33	0.88	0.44	-0.36
0.58	0.83	-0.25	1.08	0.54	-0.27
0.67	0.83	-0.17	1.04	0.52	-0.28
0.75	0.83	-0.08	0.96	0.48	-0.32
0.83	0.83	.00	1.98	0.99	.00
0.92	0.83	0.08	1.92	0.96	-0.02
1.00	0.83	0.17	1.89	0.95	-0.02
1.08	0.83	0.25	1.85	0.93	-0.03
1.17	0.83	0.33	1.82	0.91	-0.04
1.25	0.83	0.42	1.79	0.90	-0.05
1.33	0.83	0.50	1.76	0.88	-0.06
1.42	0.83	0.58	1.74	0.87	-0.06
1.50	0.83	0.67	1.71	0.86	-0.07
1.58	0.83	0.75	1.68	0.84	-0.08
1.67	0.83	0.83	1.65	0.83	-0.08
1.75	0.83	0.92	1.63	0.82	-0.09
1.83	0.83	1.00	1.62	0.81	-0.09
1.92	0.83	1.08	1.58	0.79	-0.10
2.00	0.83	1.17	1.57	0.79	-0.11
2.50	0.83	1.67	1.43	0.72	-0.15
3.00	0.83	2.17	1.30	0.65	-0.19
3.50	0.83	2.67	1.20	0.60	-0.22
4.00	0.83	3.17	1.11	0.56	-0.26
4.50	0.83	3.67	1.01	0.51	-0.30

5.00	0.83	4.17	0.93	0.47	-0.33
5.50	0.83	4.67	0.87	0.44	-0.36
6.00	0.83	5.17	0.81	0.41	-0.39
6.50	0.83	5.67	0.74	0.37	-0.43
7.00	0.83	6.17	0.68	0.34	-0.47
7.50	0.83	6.67	0.63	0.32	-0.50
8.00	0.83	7.17	0.58	0.29	-0.54
8.50	0.83	7.67	0.54	0.27	-0.57
9.00	0.83	8.17	0.50	0.25	-0.60
9.50	0.83	8.67	0.47	0.24	-0.63
10.00	0.83	9.17	0.42	0.21	-0.68
12.00	0.83	11.17	0.33	0.17	-0.78

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-5 (FALLING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	20
top of screen/open hole (from m.p.)	5
top of sandpack (from m.p.)	3
static water level (from m.p.)	5.05
length of tested interval (ft)	15
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	5.05
max. water level displacement (ft)	2.19

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.03	-0.03	0.74	0.34	-0.47
.00	0.03	-0.02	0.82	0.37	-0.43
0.01	0.03	-0.02	0.87	0.40	-0.40
0.01	0.03	-0.02	1.15	0.53	-0.28
0.01	0.03	-0.01	1.50	0.68	-0.16
0.02	0.03	-0.01	1.36	0.62	-0.21
0.02	0.03	-0.01	1.22	0.56	-0.25
0.02	0.03	.00	1.85	0.84	-0.07
0.03	0.03	0.00	2.19	1.00	0.00
0.03	0.03	.00	1.46	0.67	-0.18
0.03	0.03	0.01	1.58	0.72	-0.14
0.05	0.03	0.02	1.76	0.80	-0.09
0.07	0.03	0.04	1.14	0.52	-0.28
0.08	0.03	0.06	1.70	0.78	-0.11
0.10	0.03	0.07	1.38	0.63	-0.20
0.12	0.03	0.09	1.27	0.58	-0.24
0.13	0.03	0.11	1.23	0.56	-0.25
0.15	0.03	0.12	1.20	0.55	-0.26
0.17	0.03	0.14	1.04	0.47	-0.32
0.18	0.03	0.16	0.95	0.43	-0.36
0.20	0.03	0.17	0.88	0.40	-0.40
0.22	0.03	0.19	0.82	0.37	-0.43
0.23	0.03	0.21	0.77	0.35	-0.45
0.25	0.03	0.22	0.73	0.33	-0.48
0.27	0.03	0.24	0.68	0.31	-0.51

0.28	0.03	0.26
0.30	0.03	0.27
0.32	0.03	0.29
0.33	0.03	0.31
0.42	0.03	0.39
0.50	0.03	0.47
0.58	0.03	0.56
0.67	0.03	0.64
0.75	0.03	0.72
0.83	0.03	0.80
0.92	0.03	0.89
1.00	0.03	0.97
1.08	0.03	1.06
1.17	0.03	1.14
1.25	0.03	1.22
1.33	0.03	1.31
1.42	0.03	1.39
1.50	0.03	1.47
1.58	0.03	1.56
1.67	0.03	1.64
1.75	0.03	1.72
1.83	0.03	1.81
1.92	0.03	1.89
2.00	0.03	1.97
2.50	0.03	2.47
3.00	0.03	2.97
3.50	0.03	3.47

0.65	0.30	-0.53
0.60	0.27	-0.56
0.57	0.26	-0.58
0.54	0.25	-0.61
0.41	0.19	-0.73
0.33	0.15	-0.82
0.27	0.12	-0.91
0.22	0.10	-1.00
0.19	0.09	-1.06
0.17	0.08	-1.11
0.15	0.07	-1.16
0.14	0.06	-1.19
0.14	0.06	-1.19
0.14	0.06	-1.19
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.12	0.05	-1.26
0.14	0.06	-1.19
0.15	0.07	-1.16
0.15	0.07	-1.16

SLUG TEST DATA

PROJECT: CV-OPTION

WELL NO: MW-5 (RISING HEAD)

TEST METHOD: SLUG TEST (RISING OR FALLING HEAD)

WELL PARAMETERS:

bottom of screen/open hole (from m.p.)	20
top of screen/open hole (from m.p.)	5
top of sandpack (from m.p.)	3
static water level (from m.p.)	5.05
length of tested interval (ft)	15
riser diameter (in)	2
screen/open hole diameter (in)	2
borehole/sandpack diameter (in)	6
inner well radius (ft)	0.08
borehole radius (ft)	0.25

TEST PARAMETERS:

starting water level (from m.p.)	5.05
max. water level displacement (ft)	1.94

TIME SINCE MEASUREM'T STARTED (MINS)	TIME DIFF. (MINS)	TIME SINCE TEST START (MINS)	RESIDUAL DRAWDOWN (FEET)	DRAWDOWN RATIO DD/DDMAX	LOG OF DRAWDOWN RATIO
0.00	0.00	0.00	1.94	1.00	0.00
.00	0.00	.00	1.91	0.98	-0.01
0.01	0.00	0.01	1.88	0.97	-0.01
0.01	0.00	0.01	1.85	0.95	-0.02
0.01	0.00	0.01	1.82	0.94	-0.03
0.02	0.00	0.02	1.78	0.92	-0.04
0.02	0.00	0.02	1.75	0.90	-0.04
0.02	0.00	0.02	1.72	0.89	-0.05
0.03	0.00	0.03	1.70	0.88	-0.06
0.03	0.00	0.03	1.67	0.86	-0.07
0.03	0.00	0.03	1.66	0.86	-0.07
0.05	0.00	0.05	1.53	0.79	-0.10
0.07	0.00	0.07	1.42	0.73	-0.14
0.08	0.00	0.08	1.32	0.68	-0.17
0.10	0.00	0.10	1.23	0.63	-0.20
0.12	0.00	0.12	1.15	0.59	-0.23
0.13	0.00	0.13	1.07	0.55	-0.26
0.15	0.00	0.15	0.99	0.51	-0.29
0.17	0.00	0.17	0.93	0.48	-0.32
0.18	0.00	0.18	0.86	0.44	-0.35
0.20	0.00	0.20	0.81	0.42	-0.38
0.22	0.00	0.22	0.77	0.40	-0.40
0.23	0.00	0.23	0.72	0.37	-0.43
0.25	0.00	0.25	0.67	0.35	-0.46
0.27	0.00	0.27	0.64	0.33	-0.48

0.28	0.00	0.28
0.30	0.00	0.30
0.32	0.00	0.32
0.33	0.00	0.33
0.42	0.00	0.42
0.50	0.00	0.50
0.58	0.00	0.58
0.67	0.00	0.67
0.75	0.00	0.75
0.83	0.00	0.83
0.92	0.00	0.92
1.00	0.00	1.00
1.08	0.00	1.08
1.17	0.00	1.17
1.25	0.00	1.25
1.33	0.00	1.33
1.42	0.00	1.42
1.50	0.00	1.50
1.58	0.00	1.58
1.67	0.00	1.67
1.75	0.00	1.75
1.83	0.00	1.83
1.92	0.00	1.92
2.00	0.00	2.00
2.50	0.00	2.50
3.00	0.00	3.00
3.50	0.00	3.50

0.61	0.31	-0.50
0.58	0.30	-0.52
0.54	0.28	-0.56
0.51	0.26	-0.58
0.42	0.22	-0.66
0.35	0.18	-0.74
0.31	0.16	-0.80
0.27	0.14	-0.86
0.26	0.13	-0.87
0.23	0.12	-0.93
0.20	0.10	-0.99
0.19	0.10	-1.01
0.17	0.09	-1.06
0.14	0.07	-1.14
0.13	0.07	-1.17
0.11	0.06	-1.25
0.11	0.06	-1.25
0.09	0.05	-1.33
0.08	0.04	-1.38
0.08	0.04	-1.38
0.06	0.03	-1.51
0.06	0.03	-1.51
0.06	0.03	-1.51
0.05	0.03	-1.59
0.03	0.02	-1.81
0.01	0.01	-2.29
0.01	0.01	-2.29

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-1B S-1
RFW #: 8512-405-0060
DATE COLLECTED: December 16, 1985
DATE ANALYZED: December 27, 1985

GCMS FILE NAME: 1227W002325
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 12
DILUTION FACTOR: 1.22
WEIGHT: 5.261 gm % MOISTURE: 21.8

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	120
TOLUENE d_8	120
p-BROMOFLUOROBENZENE	122

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	ND
VINYL CHLORIDE	ND
CHLOROETHANE	ND
METHYLENE CHLORIDE	6J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	ND
1,1-DICHLOROETHANE	ND
TRANS-1,2-DICHLOROETHYLENE	ND
CHLOROFORM	ND
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	ND
CARBON TETRACHLORIDE	ND
BROMODICHLOROMETHANE	ND
1,2-DICHLOROPROPANE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND
TRICHLOROETHYLENE	2J
DIBROMOCHLOROMETHANE	ND
1,1,2-TRICHLOROETHANE	ND
BENZENE	ND
CIS-1,3-DICHLOROPROPYLENE	ND
2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	ND
TETRACHLOROETHYLENE	ND
1,1,2,2-TETRACHLOROETHANE	ND
TOLUENE	ND
CHLOROBENZENE	ND
ETHYLBENZENE	ND
DICHLOROBENZENES	NR

OTHERS:

ACETONE	ND
CARBON DISULFIDE	ND
2-BUTANONE	6J
VINYL ACETATE	ND
4-METHYL-2-PENTANONE	ND
2-HEXANONE	ND
STYRENE	ND
TOTAL XYLENES	ND

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-2 S-1
RFW #: 8512-405-0030
DATE COLLECTED: December 17, 1985
DATE ANALYZED: December 27, 1985

GCMS FILE NAME: 1227W002338
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 160
DILUTION FACTOR: 16.3
WEIGHT: 0.382 gm % MOISTURE: 19.8

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	109
TOLUENE d_8	70
p-BROMOFLUOROBENZENE	73

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	19J
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	ND	TOLUENE	72J
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	360
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	580
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	53J
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	89J
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	270
1,2-DICHLOROPROPANE	ND	2-HEXANONE	2,500
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	11,000
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-2 S-2
RFW #: 8512-405-0040
DATE COLLECTED: December 17, 1985
DATE ANALYZED: December 27, 1985

GCMS FILE NAME: 1227W002339
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 120
DILUTION FACTOR: 11.6
WEIGHT: 0.536 gm % MOISTURE: 19.5

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	109
TOLUENE d_8	100
p-BROMOFLUOROBENZENE	109

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	ND
VINYL CHLORIDE	ND
CHLOROETHANE	ND
METHYLENE CHLORIDE	ND
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	ND
1,1-DICHLOROETHANE	ND
TRANS-1,2-DICHLOROETHYLENE	ND
CHLOROFORM	ND
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	ND
CARBON TETRACHLORIDE	ND
BROMODICHLOROMETHANE	ND
1,2-DICHLOROPROPANE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND
TRICHLOROETHYLENE	ND
DIBROMOCHLOROMETHANE	ND
1,1,2-TRICHLOROETHANE	ND
BENZENE	ND
CIS-1,3-DICHLOROPROPYLENE	ND
2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	ND
TETRACHLOROETHYLENE	ND
1,1,2,2-TETRACHLOROETHANE	ND
TOLUENE	ND
CHLOROBENZENE	35J
ETHYLBENZENE	23J
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	36J
CARBON DISULFIDE	ND
2-BUTANONE	70J
VINYL ACETATE	ND
4-METHYL-2-PENTANONE	26J
2-HEXANONE	ND
STYRENE	89J
TOTAL XYLENES	680

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-3 S-1
RFW #: 8512-405-0020
DATE COLLECTED: December 19, 1985
DATE ANALYZED: December 27, 1985

GCMS FILE NAME: 1227W002327
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 12
DILUTION FACTOR: 1.15
WEIGHT: 5.123 gm % MOISTURE: 15.2

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	119
TOLUENE d_8	119
p-BROMOFLUOROBENZENE	119

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	ND
VINYL CHLORIDE	ND
CHLOROETHANE	ND
METHYLENE CHLORIDE	19
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	ND
1,1-DICHLOROETHANE	ND
TRANS-1,2-DICHLOROETHYLENE	ND
CHLOROFORM	8J
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	ND
CARBON TETRACHLORIDE	ND
BROMODICHLOROMETHANE	ND
1,2-DICHLOROPROPANE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND
TRICHLOROETHYLENE	ND
DIBROMOCHLOROMETHANE	ND
1,1,2-TRICHLOROETHANE	ND
BENZENE	ND
CIS-1,3-DICHLOROPROPYLENE	ND
2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	ND
TETRACHLOROETHYLENE	ND
1,1,2,2-TETRACHLOROETHANE	ND
TOLUENE	ND
CHLOROBENZENE	ND
ETHYLBENZENE	ND
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	ND
2-BUTANONE	6J
VINYL ACETATE	ND
4-METHYL-2-PENTANONE	ND
2-HEXANONE	ND
STYRENE	ND
TOTAL XYLENES	ND

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-3 S-2
RFW #: 8512-405-0010
DATE COLLECTED: December 19, 1985
DATE ANALYZED: December 27, 1985

GCMS FILE NAME: 1227W002326
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 10
DILUTION FACTOR: 1.1
WEIGHT: 5.258 gm % MOISTURE: 14.1

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	95
TOLUENE d_8	117
p-BROMOFLUOROBENZENE	121

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	ND
VINYL CHLORIDE	ND
CHLOROETHANE	ND
METHYLENE CHLORIDE	ND
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	ND
1,1-DICHLOROETHANE	ND
TRANS-1,2-DICHLOROETHYLENE	ND
CHLOROFORM	ND
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	ND
CARBON TETRACHLORIDE	ND
BROMODICHLOROMETHANE	ND
1,2-DICHLOROPROPANE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND
TRICHLOROETHYLENE	ND
DIBROMOCHLOROMETHANE	ND
1,1,2-TRICHLOROETHANE	ND
BENZENE	ND
CIS-1,3-DICHLOROPROPYLENE	ND
2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	ND
TETRACHLOROETHYLENE	ND
1,1,2,2-TETRACHLOROETHANE	ND
TOLUENE	ND
CHLOROBENZENE	ND
ETHYLBENZENE	ND
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	ND
2-BUTANONE	2J
VINYL ACETATE	ND
4-METHYL-2-PENTANONE	ND
2-HEXANONE	ND
STYRENE	ND
TOTAL XYLENES	ND

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY:
Earl H. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-4A S-1
RFW #: 8512-407-0030
DATE COLLECTED: December 20, 1985
DATE ANALYZED: January 3, 1986

GCMS FILE NAME: 0103W002355
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 550
DILUTION FACTOR: 55
WEIGHT: 0.101 gm % MOISTURE: 10.0

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	80
TOLUENE d_8	111
p-BROMOFLUOROBENZENE	141

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	ND
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	52J	TOLUENE	470J
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	370J
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	780
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	160J
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	ND
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	ND
1,2-DICHLOROPROPANE	ND	2-HEXANONE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	3,300
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT: This sample contains high levels of non target hydrocarbons

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-4A S-2
RFW #: 8512-407-0040
DATE COLLECTED: December 20, 1985
DATE ANALYZED: January 3, 1986

GCMS FILE NAME: 0103W002356
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 540
DILUTION FACTOR: 54
WEIGHT: 0.108 gm % MOISTURE: 14.3

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	81
TOLUENE d_8	111
p-BROMOFLUOROBENZENE	179*

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	ND
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	170J	TOLUENE	130J
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	640
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	2,200
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	ND
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	ND
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	450J
1,2-DICHLOROPROPANE	ND	2-HEXANONE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	6,700
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT: * Possible interference. This sample contains high levels of non target hydrocarbons.

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-5 S-1
RFW #: 8512-407-0010
DATE COLLECTED: December 24, 1985
DATE ANALYZED: January 3, 1986

GCMS FILE NAME: 0103W002348
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 11
DILUTION FACTOR: 1.12
WEIGHT: 5.225 gm % MOISTURE: 14.7

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	78
TOLUENE d_8	108
p-BROMOFLUOROBENZENE	111

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	ND
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	4J	TOLUENE	ND
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	ND
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	ND
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	ND
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	ND
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	ND
1,2-DICHLOROPROPANE	ND	2-HEXANONE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	ND
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY:
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-5 S-2
RFW #: 8512-407-0020
DATE COLLECTED: December 24, 1985
DATE ANALYZED: January 3, 1986

GCMS FILE NAME: 0103W002349
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 11
DILUTION FACTOR: 1.14
WEIGHT: 5.330 gm % MOISTURE: 17.5

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	76
TOLUENE d_8	107
p-BROMOFLUOROBENZENE	113

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	ND
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	3J	TOLUENE	ND
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	ND
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	ND
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	ND
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	ND
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	ND
1,2-DICHLOROPROPANE	ND	2-HEXANONE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	ND
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
GCMS FILE NAME: 1227W002324
SAMPLE DESC: Lab Blank
MATRIX: Soil
RFW #: 8512-405/406-Blank
UNITS: ug/kg DETECTION LIMIT: 10
DATE COLLECTED: N/A
DILUTION FACTOR: 1
DATE ANALYZED: December 27, 1985
WEIGHT: 5.0 gm % MOISTURE: N/A

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	109
TOLUENE d_8	95
p-BROMOFLUOROBENZENE	92

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	ND
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	2J	TOLUENE	ND
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	ND
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	ND
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	ND
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	ND
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	ND
1,2-DICHLOROPROPANE	ND	2-HEXANONE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	ND
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: Lab Soil Blank
RFW #: 8512-407-Blank
DATE COLLECTED: N/A
DATE ANALYZED: January 3, 1986

GCMS FILE NAME: 0103W002341
MATRIX: Soil
UNITS: ug/kg DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: 5.0 gm % MOISTURE: 0.0

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	89
TOLUENE d_8	126
p-BROMOFLUOROBENZENE	137

TARGET COMPOUNDS:

CHLOROMETHANE	ND	2-CHLOROETHYL VINYL ETHER	ND
BROMOMETHANE	ND	BROMOFORM	ND
VINYL CHLORIDE	ND	TETRACHLOROETHYLENE	ND
CHLOROETHANE	ND	1,1,2,2-TETRACHLOROETHANE	ND
METHYLENE CHLORIDE	1J	TOLUENE	ND
TRICHLOROFLUOROMETHANE	ND	CHLOROBENZENE	ND
1,1-DICHLOROETHYLENE	ND	ETHYLBENZENE	ND
1,1-DICHLOROETHANE	ND	DICHLOROBENZENES	NR
TRANS-1,2-DICHLOROETHYLENE	ND	OTHERS:	
CHLOROFORM	ND	ACETONE	ND
1,2-DICHLOROETHANE	ND	CARBON DISULFIDE	ND
1,1,1-TRICHLOROETHANE	ND	2-BUTANONE	ND
CARBON TETRACHLORIDE	ND	VINYL ACETATE	ND
BROMODICHLOROMETHANE	ND	4-METHYL-2-PENTANONE	ND
1,2-DICHLOROPROPANE	ND	2-HEXANONE	ND
TRANS-1,3-DICHLOROPROPYLENE	ND	STYRENE	ND
TRICHLOROETHYLENE	ND	TOTAL XYLENES	ND
DIBROMOCHLOROMETHANE	ND		
1,1,2-TRICHLOROETHANE	ND		
BENZENE	ND		
CIS-1,3-DICHLOROPROPYLENE	ND		

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: January 20, 1986

APPROVED BY:
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

APPENDIX A-4

ANALYTICAL DATA REPORTS, GROUNDWATER

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-1
RFW #: 8601-534-0010
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002765
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	92
TOLUENE d_8	86
p-BROMOFLUOROBENZENE	94

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	4J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	12
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	12
CARBON DISULFIDE	ND
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-1A
RFW #: 8601-534-0020
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002766
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	93
TOLUENE d_8	88
p-BROMOFLUOROBENZENE	97

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	4J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	5J
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-2
RFW #: 8601-534-0030
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002767
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	96
TOLUENE d_8	88
p-BROMOFLUOROBENZENE	99

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	2J
CIS-1,3-DICHLOROPROPYLENE	ND

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	6J
CHLOROBENZENE	ND
ETHYLBENZENE	16
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	110

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-2 Lab Duplicate
RFW #: 8601-534-0030RP
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002772
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	89
TOLUENE d_8	84
p-BROMOFLUOROBENZENE	99

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	2J
CIS-1,3-DICHLOROPROPYLENE	ND

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	6J
CHLOROBENZENE	ND
ETHYLBENZENE	16
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	110

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-3
RFW #: 8601-534-0040
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002768
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	94
TOLUENE d_8	87
p-BROMOFLUOROBENZENE	96

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-4
RFW #: 8601-534-0050
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002769
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	95
TOLUENE d_8	86
p-BROMOFLUOROBENZENE	102

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	2J

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-4A
RFW #: 8601-534-0060
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002770
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	94
TOLUENE d_8	89
p-BROMOFLUOROBENZENE	100

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	2J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	5J
2-BUTANONE	ND
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-5
RFW #: 8601-534-0070
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002771
MATRIX: Water
UNITS: ug/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	96
TOLUENE d_8	91
p-BROMOFLUOROBENZENE	105

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	1J
1,2-DICHLOROETHANE	ND
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-6
RFW #: 8601-534-0080
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002773
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	92
TOLUENE d_8	84
p-BROMOFLUOROBENZENE	96

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: MW-7
RFW #: 8601-534-0090
DATE COLLECTED: January 30, 1986
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002774
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	93
TOLUENE d_8	85
p-BROMOFLUOROBENZENE	104

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR
OTHERS:	
ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE PRIORITY POLLUTANT COMPOUNDS
EPA METHOD 624

CLIENT: CENTRAL VERMONT RAILWAY
SAMPLE DESC: Lab Blank
RFW #: 8601-534-Blank
DATE COLLECTED: NA
DATE ANALYZED: February 11, 1986

GCMS FILE NAME: 0211W002764
MATRIX: Water
UNITS: µg/L DETECTION LIMIT: 10
DILUTION FACTOR: 1
WEIGHT: NA % MOISTURE: NA

SURROGATE RECOVERY:

1,1-DICHLOROETHANE d_4	99
TOLUENE d_8	86
p-BROMOFLUOROBENZENE	95

TARGET COMPOUNDS:

CHLOROMETHANE	ND
BROMOMETHANE	
VINYL CHLORIDE	
CHLOROETHANE	
METHYLENE CHLORIDE	3J
TRICHLOROFLUOROMETHANE	ND
1,1-DICHLOROETHYLENE	
1,1-DICHLOROETHANE	
TRANS-1,2-DICHLOROETHYLENE	
CHLOROFORM	
1,2-DICHLOROETHANE	
1,1,1-TRICHLOROETHANE	
CARBON TETRACHLORIDE	
BROMODICHLOROMETHANE	
1,2-DICHLOROPROPANE	
TRANS-1,3-DICHLOROPROPYLENE	
TRICHLOROETHYLENE	
DIBROMOCHLOROMETHANE	
1,1,2-TRICHLOROETHANE	
BENZENE	
CIS-1,3-DICHLOROPROPYLENE	

2-CHLOROETHYL VINYL ETHER	ND
BROMOFORM	
TETRACHLOROETHYLENE	
1,1,2,2-TETRACHLOROETHANE	
TOLUENE	
CHLOROBENZENE	
ETHYLBENZENE	
DICHLOROBENZENES	NR

OTHERS:

ACETONE	ND
CARBON DISULFIDE	
2-BUTANONE	
4-METHYL-2-PENTANONE	
2-HEXANONE	
STYRENE	
TOTAL XYLENES	

COMMENT:

ND = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT

DATE: February 19, 1986

APPROVED BY: Earl M. Hansen
Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: FEBRUARY 11, 1986

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
FOR
CVR - OPTION
WATER-PESTICIDE/PCB SUMMARY REPORT

R.F.W. NO.: 8601-	DETECTION LIMIT	534-0030	534-0050		BLANK	BLANK SPIKE	BLANK SPIKE DUPLICATE
SAMPLE DESCRIPTION:		MW-2	MW-4				
DATE COLLECTED:		1-30-86	1-30-86				
DATE EXTRACTED:		2-3-86	2-3-86		2-3-86	2-3-86	2-3-86
DATE ANALYZED:		2-8-86	2-8-86		2-8-86	2-8-86	2-8-86
PARAMETER, µg/L							
Alpha-BHC	.05	N.D.	N.D.		N.D.	N.S.	N.S.
Beta-BHC						|	|
Delta-BHC							
Gamma-BHC(Lindane)						34%	47%
Heptachlor						80%	103%
Aldrin						58%	73%
Heptachlor Epoxide						|	|
Endosulfan I							
Dieldrin	.10					108%	113%
4,4-DDE						|	|
Endrin						57%	64%
Endosulfan II							
4,4-DDD							
Endrin Aldehyde							
Endosulfan Sulfate							
4,4-DDT						70%	65%
Methoxychlor	.50						
Endrin Ketone	.10						
Chlordane	.50						
Toxaphene	1.0						
Aroclor-1016	.50						
Aroclor-1221							
Aroclor-1232							
Aroclor-1242							
Aroclor-1248							
Aroclor-1254	1.0						
Aroclor-1260	1.0						

N.S. = Not Spiked

N.D. = Not Detected < detection limit

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CVR
SAMPLE DESC: Method Blank
RFW #: 8601-534-Blank
DATE COLLECTED: January 30, 1986
DATE EXTRACTED: February 3, 1986
DATE ANALYZED: February 5, 1986
WORK ORDER #: 2715-02-01

GC/MS FILE NAME: 0205B1793
MATRIX: Water
METHOD: LOW/MED LEVEL CLP (Circle One)
pH:
D.F.: 1

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10 U
111-44-4	bis(-2-Chloroethyl)Ether	
95-57-8	2-Chlorophenol	
541-73-1	1, 3-Dichlorobenzene	
106-46-7	1, 4-Dichlorobenzene	
100-51-6	Benzyl Alcohol	
95-50-1	1, 2-Dichlorobenzene	
95-48-7	2-Methylphenol	
39638-32-9	bis(2-chloroisopropyl)Ether	
106-44-5	4-Methylphenol	
621-64-7	N-Nitroso-Di-n-Propylamine	
67-72-1	Hexachloroethane	
98-95-3	Nitrobenzene	
78-59-1	Isophorone	
88-75-5	2-Nitrophenol	
105-67-9	2, 4-Dimethylphenol	
65-85-0	Benzoic Acid (2)	50 U
111-91-1	bis(-2-Chloroethoxy)Methane	10 U
120-83-2	2, 4-Dichlorophenol	
120-82-1	1, 2, 4-Trichlorobenzene	
91-20-3	Naphthalene	
106-47-8	4-Chloroaniline	
87-68-3	Hexachlorobutadiene	
59-50-7	4-Chloro-3-Methylphenol	
91-57-6	2-Methylnaphthalene	
77-47-4	Hexachlorocyclopentadiene	
88-06-2	2, 4, 6-Trichlorophenol	
95-95-4	2, 4, 5-Trichlorophenol (2)	50 U
91-58-7	2-Chloronaphthalene	10 U
88-74-4	2-Nitroaniline (2)	50 U
131-11-3	Dimethyl Phthalate	10 U
208-96-8	Acenaphthylene	10 U
99-09-2	3-Nitroaniline (2)	50 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	10 U
51-28-5	2, 4-Dinitrophenol (2)	50 U
100-02-7	4-Nitrophenol (2)	50 U
132-64-9	Dibenzofuran	10 U
121-14-2	2 4-Dinitrotoluene	
606-20-2	2, 6-Dinitrotoluene	
84-66-2	Diethylphthalate	
7005-72-3	4-Chlorophenyl-phenylether	
86-73-7	Fluorene	
100-01-6	4-Nitroaniline (2)	50 U
534-52-1	4, 6-Dinitro-2-Methylphenol (2)	50 U
86-30-6	N-Nitrosodiphenylamine (1)	10 U
101-55-3	4-Bromophenyl-phenylether	
118-74-1	Hexachlorobenzene	
87-86-5	Pentachlorophenol (2)	50 U
85-01-8	Phenanthrene	10 U
120-12-7	Anthracene	
84-74-2	Di-n-Butylphthalate	
206-44-0	Fluoranthene	
129-00-0	Pyrene	
85-68-7	Butylbenzylphthalate	
91-94-1	3, 3'-Dichlorobenzidine (3)	20 U
56-55-3	Benzo(a)Anthracene	10 U
117-81-7	bis(2-Ethylhexyl)Phthalate	
218-01-9	Chrysene	
117-84-0	Di-n-Octyl Phthalate	
205-99-2	Benzo(b)Fluoranthene	
207-08-9	Benzo(k)Fluoranthene	
50-32-8	Benzo(a)Pyrene	
193-39-5	Indeno(1, 2, 3-cd)Pyrene	
53-70-3	Dibenz(a, h)Anthracene	
191-24-2	Benzo(g, h, i)Perylene	

(1) Cannot be separated from Diphenylamine
(2) MDL = 5X other HSL Compounds
(3) MDL = 2X other HSL Compounds

Data reporting qualifiers: (see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

Approved By: Earl M. Hansen

DATE: March 4, 1986

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CVR
SAMPLE DESC: MW-2
RFW #: 8601-539-0030
DATE COLLECTED: January 30, 1986
DATE EXTRACTED: February 3, 1986
DATE ANALYZED: February 5, 1986
WORK ORDER #: 2715-02-01

GC/MS FILE NAME: 0205B1798
MATRIX: Water
METHOD: LOW/MED LEVEL CLP (Circle One)
pH:
D.F.: 1

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10 U
111-44-4	bis(-2-Chloroethyl)Ether	
95-57-8	2-Chlorophenol	
541-73-1	1, 3-Dichlorobenzene	
106-46-7	1, 4-Dichlorobenzene	
100-51-6	Benzyl Alcohol	
95-50-1	1, 2-Dichlorobenzene	
95-48-7	2-Methylphenol	
39638-32-9	bis(2-chloroisopropyl)Ether	
106-44-5	4-Methylphenol	
621-64-7	N-Nitroso-Di-n-Propylamine	
67-72-1	Hexachloroethane	
98-95-3	Nitrobenzene	
78-59-1	Isophorone	
88-75-5	2-Nitrophenol	
105-67-9	2, 4-Dimethylphenol	
65-85-0	Benzoic Acid (2)	50 U
111-91-1	bis(-2-Chloroethoxy)Methane	10 U
120-83-2	2, 4-Dichlorophenol	10 U
120-82-1	1, 2, 4-Trichlorobenzene	10 U
91-20-3	Naphthalene	13
106-47-8	4-Chloroaniline	10 U
87-68-3	Hexachlorobutadiene	10 U
59-50-7	4-Chloro-3-Methylphenol	10 U
91-57-6	2-Methylnaphthalene	23
77-47-4	Hexachlorocyclopentadiene	10 U
88-06-2	2, 4, 6-Trichlorophenol	10 U
95-95-4	2, 4, 5-Trichlorophenol (2)	50 U
91-58-7	2-Chloronaphthalene	10 U
88-74-4	2-Nitroaniline (2)	50
131-11-3	Dimethyl Phthalate	10 U
208-96-8	Acenaphthylene	10 U
99-09-2	3-Nitroaniline (2)	50 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	1 J
51-28-5	2, 4-Dinitrophenol (2)	50 U
100-02-7	4-Nitrophenol (2)	50 U
132-64-9	Dibenzofuran	10 U
121-14-2	2 4-Dinitrotoluene	
606-20-2	2, 6-Dinitrotoluene	
84-66-2	Diethylphthalate	
7005-72-3	4-Chlorophenyl-phenylether	
86-73-7	Fluorene	
100-01-6	4-Nitroaniline (2)	50 U
534-52-1	4, 6-Dinitro-2-Methylphenol (2)	50 U
86-30-6	N-Nitrosodiphenylamine (1)	10 U
101-55-3	4-Bromophenyl-phenylether	10 U
118-74-1	Hexachlorobenzene	10 U
87-86-5	Pentachlorophenol (2)	50 U
85-01-8	Phenanthrene	3 J
120-12-7	Anthracene	10 U
84-74-2	Di-n-Butylphthalate	
206-44-0	Fluoranthene	
129-00-0	Pyrene	
85-68-7	Butylbenzylphthalate	
91-94-1	3, 3'-Dichlorobenzidine (3)	20 U
56-55-3	Benzo(a)Anthracene	10 U
117-81-7	bis(2-Ethylhexyl)Phthalate	4 J
218-01-9	Chrysene	10 U
117-84-0	Di-n-Octyl Phthalate	
205-99-2	Benzo(b)Fluoranthene	
207-08-9	Benzo(k)Fluoranthene	
50-32-8	Benzo(a)Pyrene	
193-39-5	Indeno(1, 2, 3-cd)Pyrene	
53-70-3	Dibenz(a, h)Anthracene	
191-24-2	Benzo(g, h, i)Perylene	

(1) Cannot be separated from Diphenylamine
(2) MDL = 5X other HSL Compounds
(3) MDL = 2X other HSL Compounds

Data reporting qualifiers: (see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

Approved By: Earl M. Hansen

DATE: March 4, 1986

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CVR
SAMPLE DESC: MW-4
RFW #: 8601-534-0050
DATE COLLECTED: January 30, 1986
DATE EXTRACTED: February 3, 1986
DATE ANALYZED: February 5, 1986
WORK ORDER #: 2715-02-01

GC/MS FILE NAME: 0205B1799
MATRIX: Water
METHOD: LOW/MED LEVEL CLP (Circle One)
pH:
D.F.: 1

CAS Number		ug/l or ug/Kg (Circle One)
108-95-2	Phenol	10 U
111-44-4	bis(-2-Chloroethyl)Ether	
95-57-8	2-Chlorophenol	
541-73-1	1, 3-Dichlorobenzene	
106-46-7	1, 4-Dichlorobenzene	
100-51-6	Benzyl Alcohol	
95-50-1	1, 2-Dichlorobenzene	
95-48-7	2-Methylphenol	
39638-32-9	bis(2-chloroisopropyl)Ether	
106-44-5	4-Methylphenol	
621-64-7	N-Nitroso-Di-n-Propylamine	
67-72-1	Hexachloroethane	
98-95-3	Nitrobenzene	
78-59-1	Isophorone	
88-75-5	2-Nitrophenol	
105-67-9	2, 4-Dimethylphenol	
65-85-0	Benzoic Acid (2)	50 U
111-91-1	bis(-2-Chloroethoxy)Methane	10 U
120-83-2	2, 4-Dichlorophenol	
120-82-1	1, 2, 4-Trichlorobenzene	
91-20-3	Naphthalene	
106-47-8	4-Chloroaniline	
87-68-3	Hexachlorobutadiene	
59-50-7	4-Chloro-3-Methylphenol	
91-57-6	2-Methylnaphthalene	
77-47-4	Hexachlorocyclopentadiene	
88-06-2	2, 4, 6-Trichlorophenol	
95-95-4	2, 4, 5-Trichlorophenol (2)	50 U
91-58-7	2-Chloronaphthalene	10 U
88-74-4	2-Nitroaniline (2)	50 U
131-11-3	Dimethyl Phthalate	10 U
208-96-8	Acenaphthylene	10 U
99-09-2	3-Nitroaniline (2)	50 U

CAS Number		ug/l or ug/Kg (Circle One)
83-32-9	Acenaphthene	10 U
51-28-5	2, 4-Dinitrophenol (2)	50 U
100-02-7	4-Nitrophenol (2)	50 U
132-64-9	Dibenzofuran	10 U
121-14-2	2 4-Dinitrotoluene	
606-20-2	2, 6-Dinitrotoluene	
84-66-2	Diethylphthalate	
7005-72-3	4-Chlorophenyl-phenylether	
86-73-7	Fluorene	
100-01-6	4-Nitroaniline (2)	50 U
534-52-1	4, 6-Dinitro-2-Methylphenol (2)	50 U
86-30-6	N-Nitrosodiphenylamine (1)	10 U
101-55-3	4-Bromophenyl-phenylether	
118-74-1	Hexachlorobenzene	
87-86-5	Pentachlorophenol (2)	50 U
85-01-8	Phenanthrene	10 U
120-12-7	Anthracene	
84-74-2	Di-n-Butylphthalate	
206-44-0	Fluoranthene	
129-00-0	Pyrene	
85-68-7	Butylbenzylphthalate	
91-94-1	3, 3'-Dichlorobenzidine (3)	20 U
56-55-3	Benzo(a)Anthracene	10 U
117-81-7	bis(2-Ethylhexyl)Phthalate	4 J
218-01-9	Chrysene	10 U
117-84-0	Di-n-Octyl Phthalate	
205-99-2	Benzo(b)Fluoranthene	
207-08-9	Benzo(k)Fluoranthene	
50-32-8	Benzo(a)Pyrene	
193-39-5	Indeno(1, 2, 3-cd)Pyrene	
53-70-3	Dibenz(a, h)Anthracene	
191-24-2	Benzo(g, h, i)Perylene	

(1) Cannot be separated from Diphenylamine
(2) MDL = 5X other HSL Compounds
(3) MDL = 2X other HSL Compounds

Data reporting qualifiers: (see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

Approved By: Earl M. Hansen

DATE: March 4, 1986

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

WESTON

DATE OF REPORT: March 4, 1986

BNA WATER BLANK SPIKE/BLANK SPIKE DUPLICATE RECOVERY

Compound	CONC. Spike Added ug/L	Sample Result	CONC. BS	% REC	CONC. BSD	% REC	RPD	QC - LIMITS RPP	RECOVERY RAN
1,2,4-Trichlorobenzene	50.0	0.	45.1	90	45.0	90	0	28	39-98
Acenaphthene	50.0	0.	49.0	98	48.3	97	1	31	46-118
2,4-Dinitrotoluene	50.0	0.	36.8	74	36.8	74	0	38	24-96
Pyrene	50.0	0.	54.5	109	54.7	109	0	31	26-127
N-Nitroso-Di-n-Propylamine	50.0	0.	46.4	93	43.7	87	6	38	41-116
1,4-Dichlorobenzene	50.0	0.	46.0	92	45.4	91	1	28	36-97
Pentachlorophenol	100.0	0.	76.7	77	79.0	79	-3	50	9-103
Phenol	100.0	0.	34.4	34	34.7	35	-1	42	12-89
2-Chlorophenol	100.0	0.	97.0	97	96.1	96	1	40	27-123
4-Chloro-3-Methylphenol	100.0	0.	94.0	94	90.1	90	4	42	23-97
4-Nitrophenol	100.0	0.	44.1	44	42.2	42	4	50	10-80

All Values are within QC Limits.

APPROVED BY Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

WESTON

BNA - Water Surrogate Percent Recovery Summary

	MB1	BS	BSD	MW-2	MW-4	QC Limits
Nitrobenzene-d_5	94	107	102	65	72	35-114
2-Fluorobiphenyl	108	106	105	78	75	43-116
Terphenyl-d_{14}	107	113	112	104	107	33-141
Phenol d_5	39	43	42	45	42	10-94
2-Fluorophenol	63	66	61	55	56	21-100
2,4,6-Tribromophenol	94	115	114	105	116	48-136

All values are within QC limits

APPROVED BY Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laborato

DATE OF REPORT: 03/07/86

CLIENT: CVR- OPTION
DATA SUMMARY REPORT FOR
SAMPLES RECEIVED: 2-4-86
W.O.NUMBER: 2715-02-01

DATE SAMPLE COLLECTED: 1-30/31-86
SAMPLE COLLECTED BY:. UNKNOWN

RFWSN	DESCRIPTION	AS MG/L	CD MG/L	CR MG/L	CU MG/L	HG UG/L	NI MG/L	PB MG/L
8602-548-0010	RFW-2	<.010	<.005	.173	<.025	<.5	.057	<.005
-001K	MATRIX SPIKE			.262	.230		.377	
-001K	SPIKE RECOVERY			44.5%	88.4%		80.0%	
-0020	RFW-4	<.010	<.005	.019	<.025	<.5	<.040	<.005
-002K	MATRIX SPIKE	.012		LOD= 0.010				
-002K	SPIKE RECOVERY	61.5%						
	METHOD BLANK	<.010				<.5		<.005
	METHOD BLANK	<.010						<.005
	METHOD SPIKE	.012				5.02		
	SPIKE RECOVERY	.012				100%		
	SPIKE RECOVERY	60.0%						

RFWSN	DESCRIPTION	ZN MG/L
8602-548-0010	RFW-2	.044
-001K	MATRIX SPIKE	.233
-001K	SPIKE RECOVERY	94.5%
-0020	RFW-4	.082
		LOD = 0.020

PREPARED BY Stephanie Dobbs
STEPHANIE DOBBS
DATA MANAGER
WESTON ANALYTICAL LABORATORIES

APPROVED BY Earl M. Hansen
EARL M. HANSEN, PH.D.
MANAGER
WESTON ANALYTICAL LABORATORIES

DATE OF REPORT: 03/18/86

CLIENT: CVR-OPTION
DATA SUMMARY REPORT FOR
SAMPLES RECEIVED: 1-31-86
W.O.NUMBER: 2715-02-01

DATE SAMPLE COLLECTED: 1-30-86
SAMPLE COLLECTED BY:. CHRIS CARLEO

RFWSN	DESCRIPTION	PHENOL
8601-534-0030	MW-2	.013 MG/L
-003K	MATRIX SPIKE	.103 MG/L
-003K	SPIKE RECOVERY	112 %
-0050	MW-4	<.005 MG/L
-005R	REPLICATE	<.005 MG/L
-005S	PRECISION	NC
	METHOD BLANK	<.005 MG/L
	METHOD SPIKE	.036 MG/L
	SPIKE RECOVERY	102 %

PREPARED BY Stephanie Dobbs
STEPHANIE DOBBS
DATA MANAGER
WESTON ANALYTICAL LABORATORIES

APPROVED BY Earl M. Hansen
EARL M. HANSEN, PH.D.
MANAGER
WESTON ANALYTICAL LABORATORIES

CVR OPTION PAGE 2

RFWSN	DESCRIPTION	PERCENT MOISTURE	BOD5	CYANIDE TOTAL
8602-628-0010	SS-4 ELUTRIATE		54 MG/L	
-0010	SS-4 ELUTRIATE			<.010 MG/L
-0020	MW-4			<.010 MG/L
-002R	MW-4REPLICATE			NC
-002S	PRECISION			<.010 MG/L
-0030	MW-2			.093 MG/L
-003K	MW-2MATRIX SPIKE			93.0 %
-003K	SPIKE RECOVERY			
-0060	SS-4 SEDIMENT	17.6 %		
	METHOD BLANK			<.010 MG/L
	METHOD SPIKE			.510 MG/L
	SPIKE RECOVERY			90.9 %

RFWSN	DESCRIPTION	nitrate nitrite	NITROGEN - AMMONIA
8602-628-0010	SS-4 ELUTRIATE	.30 MG/L	.530 MG/L
-001K	SS-4 MATRIX SPIKE		.690 MG/L
-001K	SPIKE RECOVERY		80.0 %
-001R	SS-4 REPLICATE		.510 MG/L
-001S	PRECISION		3.85 %
-0060	SS-4 SEDIMENT	.50 UG/G	<10 UG/G
	METHOD BLANK	<.2 MG/L	<3 UG/G
	METHOD BLANK		<.03 MG/L
	METHOD SPIKE		.250 MG/L
	SPIKE RECOVERY		92.9 %
	METHOD SPIKE	2.10 MG/L	
	SPIKE RECOVERY	105 %	

RFWSN	DESCRIPTION	OIL & GREASE	PH	PHOSPHORUS
8602-628-0010	SS-4 ELUTRIATE	3 MG/L	7.70 PHUNT	<.05 MG/L
-0020	MW-4	11 MG/L		
-002K	MW-4MATRIX SPIKE	174 MG/L		
-002K	SPIKE RECOVERY	95.9 %		
-0030	MW-2	2 MG/L		
-0060	SS-4 SEDIMENT	1400 MG/KG		381 UG/G
-006K	SS-4MATRIX SPIKE			485 UG/G
-006K	SPIKE RECOVERY			168 %
	METHOD BLANK			<.02 MG/L
	METHOD BLANK			<10 UG/G
	METHOD SPIKE			.089 MG/L
	SPIKE RECOVERY			99.0 %
	METHOD SPIKE			54.4 UG/G
	SPIKE RECOVERY			109 %

APPENDIX B

OFF-SHORE INVESTIGATION

APPENDIX B-1

OFF-SHORE BORING LOGS

CON-TEC, INC.
P.O. BOX 1153
CONCORD, N.H. 03301
603-224-0020

CENTRAL VERMONT RAILWAY
OFFSHORE SEDIMENT SAMPLING
BURLINGTON, VT

TEST BORING LOG

CON–TEC., INC.
P.O. BOX 1153
CONCORD, N.H. 03301
603-224-0020

PROJECT CVR

LOCATION BURLINGTON, VT

HOLE NO. SS1

DATE STARTED 2/24/86 COMPLETED 2/24/86

SURF. ELEV.

GROUND WATER At Surface

JOB NO. 8624

N-NO OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C-NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

BORING MADE WITH 2⅜" CASING

DEPTH	C.	N.	SPL. NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					ICE 1.0'
					WATER 6.0'
5.0'					
		WT	1	6'-8'	Grayish black, wet, very loose to loose, fine SAND, trace fine gravel 11.5'
		WT			
		2-2	2	8'-10'	
10.0'		3-4			
		8-10	3	10'-12'	
		11-13			
		15-21	4	12'-14'	Olive, wet, dense, fine SAND and SILT 13.5'
		34-27			
15.0'					Gray, dry, very dense SILT 14.0'
					BOTTOM OF BORING 14.0'

Note: WT = Weight of Drill Tools

TEST BORING LOG

CON–TEC., INC.
P.O. BOX 1153
CONCORD, N.H. 03301
603-224-0020

PROJECT CVR

LOCATION BURLINGTON, VT

HOLE NO. SS-2

DATE STARTED 2/25/86 COMPLETED 2/25/86

SURF. ELEV.

GROUND WATER At Surface

JOB NO. 8624

N-NO OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C-NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

BORING MADE WITH 2½" CASING

DEPTH	C.	N.	SPL. NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					ICE 1.0'
					WATER 7.0'
5.0'					
		2-3	1	7'-9'	Black, wet, loose to medium dense, fine SAND and SILT, trace fine gravel 10.5'
		5-7			
10.0'		7-5	2	9'-11'	
		10-21			
			3	11'-13'	Olive, wet, dense to very dense, fine SAND and SILT 15.0'
		15-18	4	13'-15'	
15.0'		23-47			BOTTOM OF BORING 15.0'

TEST BORING LOG

CON-TEC., INC.
P.O. BOX 1153
CONCORD, N.H. 03301
603-224-0020

PROJECT CVR

LOCATION BURLINGTON, VT

HOLE NO. SS-2

DATE STARTED 2/25/86 COMPLETED 2/25/86

SURF. ELEV.

GROUND WATER At Surface

JOB NO. 8624

N-NO OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C-NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

BORING MADE WITH 2½" CASING

DEPTH	C.	N.	SPL. NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					ICE 1.0'
					WATER 7.0'
5.0'					
		2-3	1	7'-9'	
		5-7			
10.0'		7-5	2	9'-11'	Black, wet, loose to medium dense, fine SAND and SILT, trace fine gravel 10.5'
		10-21			
			3	11'-13'	
					Olive, wet, dense to very dense, fine SAND and SILT 15.0'
		15-18	4	13'-15'	
15.0'		23-47			
					BOTTOM OF BORING 15.0'

TEST BORING LOG

CON–TEC., INC.
P.O. BOX 1153
CONCORD, N.H. 03301
603-224-0020

PROJECT CVR

LOCATION BURLINGTON, VT

HOLE NO. SS-3

DATE STARTED 2/25/86 COMPLETED 2/25/86

SURF. ELEV.

GROUND WATER At Surface

JOB NO. 8624

N-NO OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C-NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

BORING MADE WITH 2½" CASING

DEPTH	C.	N.	SPL. NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					ICE 1.0'
		5-6	1	2'-4'	WATER 2.0'
		8-9			
5.0'		2-4	2	4'-6'	Gray, wet, medium dense to loose, fine SAND and SILT, trace wood 9.0'
		4-3			
		2-2	3	6'-8'	
		3-2			
		1-1	4	8'-10'	
10.0'		2-3			Olive, wet, loose, fine SAND and SILT 10.0'
					BOTTOM OF BORING 10.0'
15.0'					

TEST BORING LOG

CON–TEC., INC.
P.O. BOX 1153
CONCORD, N.H. 03301
603-224-0020

PROJECT CVR

LOCATION BURLINGTON, VT

HOLE NO. SS-4

DATE STARTED 2/25/86 COMPLETED 2/25/86

SURF. ELEV.

GROUND WATER At Surface

JOB NO. 8624

N-NO OF BLOWS TO DRIVE 2" SAMPLER 6" W/140 LB. WEIGHT FALLING 30"

C-NO. OF BLOWS TO DRIVE CASING 12" W/300 LB. WEIGHT FALLING 24"

SHEET 1 OF 1

BORING MADE WITH 2½" CASING

DEPTH	C.	N.	SPL. NO.	SAMPLE DEPTH	DESCRIPTION OF MATERIAL
					ICE 1.0'
					WATER 3.0'
		1-1	1	3'-5'	Gray, wet, very loose to loose, fine SAND and SILT, trace fine gravel 7.0'
5.0'		2-1			
		2-4	2	5'-7'	
		3-2			
		4-5	3	7'-9'	Olive, wet, medium dense fine SAND and SILT 11.0'
		4-7			
10.0'		5-5	4	9'-11'	BOTTOM OF BORING 11.0'
		6-5			
15.0'					

APPENDIX B-2

ANALYTICAL DATA REPORTS, OFF-SHORE SAMPLES

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SW-1
RFW #: 8602-625-0030
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002892
MATRIX: Water
METHOD: (LOW/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE NA
DILUTION FACTOR: 1

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	"
75-01-4	Vinyl Chloride	"
75-00-3	Chloroethane	"
75-09-2	Methylene Chloride	8 J
67-64-1	Acetone	5 J
75-15-0	Carbon Disulfide	1 J
75-35-4	1, 1-Dichloroethene	10 U
75-34-3	1, 1-Dichloroethane	"
156-60-5	Trans-1, 2-Dichloroethene	"
67-66-3	Chloroform	"
107-06-2	1, 2-Dichloroethane	"
78-93-3	2-Butanone	5 J
71-55-6	1, 1, 1-Trichloroethane	10 U
56-23-5	Carbon Tetrachloride	"
108-05-4	Vinyl Acetate	"
75-27-4	Bromodichloromethane	"

CAS Number		ug/l or ug/Kg (Circle One)
78-87-5	1, 2-Dichloropropane	10 U
10061-02-6	Trans-1, 3-Dichloropropene	"
79-01-6	Trichloroethene	"
124-48-1	Dibromochloromethane	"
79-00-5	1, 1, 2-Trichloroethane	"
71-43-2	Benzene	"
10061-01-5	cis-1, 3-Dichloropropene	"
110-75-8	2-Chloroethylvinylether	"
75-25-2	Bromoform	"
591-78-6	4-Methyl-2-Pentanone	"
108-10-1	2-Hexanone	"
127-18-4	Tetrachloroethene	"
79-34-5	1, 1, 2, 2-Tetrachloroethane	"
108-88-3	Toluene	"
108-90-7	Chlorobenzene	"
100-41-4	Ethylbenzene	"
100-42-5	Styrene	"
	Total Xylenes	"

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	127
Toluene-d_8	113
p-Bromofluorobenzene	98

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-1 2-4'
RFW #: 8602-622-0020
DATE COLLECTED: 24 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002897
MATRIX: Soil
METHOD: (LOW/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 21.4
DILUTION FACTOR: 2.8

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	28 U
74-83-9	Bromomethane	
75-01-4	Vinyl Chloride	
75-00-3	Chloroethane	
75-09-2	Methylene Chloride	42
67-64-1	Acetone	680
75-15-0	Carbon Disulfide	24 J
75-35-4	1, 1-Dichloroethene	28 U
75-34-3	1, 1-Dichloroethane	
156-60-5	Trans-1, 2-Dichloroethene	
67-66-3	Chloroform	3 J
107-06-2	1, 2-Dichloroethane	28 U
78-93-3	2-Butanone	160
71-55-6	1, 1, 1-Trichloroethane	28 U
56-23-5	Carbon Tetrachloride	
108-05-4	Vinyl Acetate	
75-27-4	Bromodichloromethane	

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1, 2-Dichloropropane	28 U
10061-02-6	Trans-1, 3-Dichloropropene	
79-01-6	Trichloroethene	
124-48-1	Dibromochloromethane	
79-00-5	1, 1, 2-Trichloroethane	
71-43-2	Benzene	
10061-01-5	cis-1, 3-Dichloropropene	
110-75-8	2-Chloroethylvinylether	
75-25-2	Bromoform	
591-78-6	4-Methyl-2-Pentanone	
108-10-1	2-Hexanone	
127-18-4	Tetrachloroethene	
79-34-5	1, 1, 2, 2-Tetrachloroethane	
108-88-3	Toluene	5 J
108-90-7	Chlorobenzene	28 U
100-41-4	Ethylbenzene	6 J
100-42-5	Styrene	28 U
	Total Xylenes	68

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	128
Toluene-d_8	118
p-Bromofluorobenzene	106

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

RFW 21-21-009/C-2/86

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-1 11'
RFW #: 8602-622-0020B
DATE COLLECTED: 24 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002898
MATRIX: Soil
METHOD: (LOW)/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 13.8
DILUTION FACTOR: 2.5

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	25 U
74-83-9	Bromomethane	"
75-01-4	Vinyl Chloride	"
75-00-3	Chloroethane	"
75-09-2	Methylene Chloride	37
67-64-1	Acetone	84
75-15-0	Carbon Disulfide	31
75-35-4	1, 1-Dichloroethene	25 U
75-34-3	1, 1-Dichloroethane	"
156-60-5	Trans-1, 2-Dichloroethene	"
67-66-3	Chloroform	4 J
107-06-2	1, 2-Dichloroethane	25 U
78-93-3	2-Butanone	100
71-55-6	1, 1, 1-Trichloroethane	25 U
56-23-5	Carbon Tetrachloride	"
108-05-4	Vinyl Acetate	"
75-27-4	Bromodichloromethane	"

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1, 2-Dichloropropane	25 U
10061-02-6	Trans-1, 3-Dichloropropene	"
79-01-6	Trichloroethene	"
124-48-1	Dibromochloromethane	"
79-00-5	1, 1, 2-Trichloroethane	"
71-43-2	Benzene	"
10061-01-5	cis-1, 3-Dichloropropene	"
110-75-8	2-Chloroethylvinylether	"
75-25-2	Bromoform	"
591-78-6	4-Methyl-2-Pentanone	"
108-10-1	2-Hexanone	"
127-18-4	Tetrachloroethene	"
79-34-5	1, 1, 2, 2-Tetrachloroethane	"
108-88-3	Toluene	"
108-90-7	Chlorobenzene	"
100-41-4	Ethylbenzene	"
100-42-5	Styrene	"
	Total Xylenes	"

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	127
Toluene-d_8	111
p-Bromofluorobenzene	102

COMMENT:

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

DATE: 19 March 1986

APPROVED BY: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-2 7-9'
RFW #: 8602-625-0070
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002895
MATRIX: Soil
METHOD: (LOW/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 21.5
DILUTION FACTOR: 2.86

CAS Number		ug/l or ug/Kg (Circle One)
74-87-3	Chloromethane	29 U
74-83-9	Bromomethane	"
75-01-4	Vinyl Chloride	"
75-00-3	Chloroethane	"
75-09-2	Methylene Chloride	38
67-64-1	Acetone	230
75-15-0	Carbon Disulfide	90
75-35-4	1,1-Dichloroethene	29 U
75-34-3	1,1-Dichloroethane	"
156-60-5	Trans-1,2-Dichloroethene	"
67-66-3	Chloroform	4 J
107-06-2	1,2-Dichloroethane	29 U
78-93-3	2-Butanone	38
71-55-6	1,1,1-Trichloroethane	29 U
56-23-5	Carbon Tetrachloride	"
108-05-4	Vinyl Acetate	"
75-27-4	Bromodichloromethane	"

CAS Number		ug/l or ug/Kg (Circle One)
78-87-5	1,2-Dichloropropane	29 U
10061-02-6	Trans-1,3-Dichloropropene	"
79-01-6	Trichloroethene	"
124-48-1	Dibromochloromethane	"
79-00-5	1,1,2-Trichloroethane	"
71-43-2	Benzene	"
10061-01-5	cis-1,3-Dichloropropene	"
110-75-8	2-Chloroethylvinylether	"
75-25-2	Bromoform	"
591-78-6	4-Methyl-2-Pentanone	"
108-10-1	2-Hexanone	"
127-18-4	Tetrachloroethene	"
79-34-5	1,1,2,2-Tetrachloroethane	"
108-88-3	Toluene	3 J
108-90-7	Chlorobenzene	29 U
100-41-4	Ethylbenzene	"
100-42-5	Styrene	"
	Total Xylenes	"

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	134
Toluene-d_8	118
p-Bromofluorobenzene	97

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-2 13-15'
RFW #: 8602-625-0080
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002896
MATRIX: Soil
METHOD: (LOW)/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 16.2
DILUTION FACTOR: 1.2

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	12 U
74-83-9	Bromomethane	"
75-01-4	Vinyl Chloride	"
75-00-3	Chloroethane	2 J
75-09-2	Methylene Chloride	34
67-64-1	Acetone	12 U
75-15-0	Carbon Disulfide	27
75-35-4	1,1-Dichloroethene	12 U
75-34-3	1,1-Dichloroethane	"
156-60-5	Trans-1,2-Dichloroethene	"
67-66-3	Chloroform	3 J
107-06-2	1,2-Dichloroethane	12 U
78-93-3	2-Butanone	6 J
71-55-6	1,1,1-Trichloroethane	12 U
56-23-5	Carbon Tetrachloride	"
108-05-4	Vinyl Acetate	"
75-27-4	Bromodichloromethane	"

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1,2-Dichloropropane	12 U
10061-02-6	Trans-1,3-Dichloropropene	"
79-01-6	Trichloroethene	"
124-48-1	Dibromochloromethane	"
79-00-5	1,1,2-Trichloroethane	"
71-43-2	Benzene	"
10061-01-5	cis-1,3-Dichloropropene	"
110-75-8	2-Chloroethylvinylether	"
75-25-2	Bromoform	"
591-78-6	4-Methyl-2-Pentanone	"
108-10-1	2-Hexanone	"
127-18-4	Tetrachloroethene	"
79-34-5	1,1,2,2-Tetrachloroethane	"
108-88-3	Toluene	"
108-90-7	Chlorobenzene	"
100-41-4	Ethylbenzene	"
100-42-5	Styrene	"
	Total Xylenes	"

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	130
Toluene-d_8	120
p-Bromofluorobenzene	105

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-3 5'
RFW #: 8602-625-0040
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002893
MATRIX: Soil
METHOD: (LOW)/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 12.9
DILUTION FACTOR: 4.4

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	44 U
74-83-9	Bromomethane	
75-01-4	Vinyl Chloride	
75-00-3	Chloroethane	
75-09-2	Methylene Chloride	200
67-64-1	Acetone	370
75-15-0	Carbon Disulfide	300
75-35-4	1,1-Dichloroethene	44 U
75-34-3	1,1-Dichloroethane	
156-60-5	Trans-1,2-Dichloroethene	
67-66-3	Chloroform	23 J
107-06-2	1,2-Dichloroethane	44 U
78-93-3	2-Butanone	240
71-55-6	1,1,1-Trichloroethane	44 U
56-23-5	Carbon Tetrachloride	
108-05-4	Vinyl Acetate	
75-27-4	Bromodichloromethane	

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1,2-Dichloropropane	44 U
10061-02-6	Trans-1,3-Dichloropropene	
79-01-6	Trichloroethene	
124-48-1	Dibromochloromethane	
79-00-5	1,1,2-Trichloroethane	
71-43-2	Benzene	
10061-01-5	cis-1,3-Dichloropropene	
110-75-8	2-Chloroethylvinylether	
75-25-2	Bromoform	
591-78-6	4-Methyl-2-Pentanone	
108-10-1	2-Hexanone	
127-18-4	Tetrachloroethene	
79-34-5	1,1,2,2-Tetrachloroethane	
108-88-3	Toluene	14 J
108-90-7	Chlorobenzene	44 U
100-41-4	Ethylbenzene	
100-42-5	Styrene	
	Total Xylenes	

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	125
Toluene-d_8	112
p-Bromofluorobenzene	96

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-3 9'
RFW #: 8602-625-0050
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002894
MATRIX: Soil
METHOD: (LOW)/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 29.1
DILUTION FACTOR: 1.4

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	14 U
74-83-9	Bromomethane	
75-01-4	Vinyl Chloride	
75-00-3	Chloroethane	
75-09-2	Methylene Chloride	59
67-64-1	Acetone	360
75-15-0	Carbon Disulfide	46
75-35-4	1, 1-Dichloroethene	14 U
75-34-3	1, 1-Dichloroethane	
156-60-5	Trans-1, 2-Dichloroethene	
67-66-3	Chloroform	9 J
107-06-2	1, 2-Dichloroethane	14 U
78-93-3	2-Butanone	82
71-55-6	1, 1, 1-Trichloroethane	14 U
56-23-5	Carbon Tetrachloride	
108-05-4	Vinyl Acetate	
75-27-4	Bromodichloromethane	

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1, 2-Dichloropropane	14 U
10061-02-6	Trans-1, 3-Dichloropropene	
79-01-6	Trichloroethene	
124-48-1	Dibromochloromethane	
79-00-5	1, 1, 2-Trichloroethane	
71-43-2	Benzene	
10061-01-5	cis-1, 3-Dichloropropene	
110-75-8	2-Chloroethylvinylether	
75-25-2	Bromoform	
591-78-6	4-Methyl-2-Pentanone	
108-10-1	2-Hexanone	
127-18-4	Tetrachloroethene	
79-34-5	1, 1, 2, 2-Tetrachloroethane	
108-88-3	Toluene	5 J
108-90-7	Chlorobenzene	14 U
100-41-4	Ethylbenzene	
100-42-5	Styrene	
	Total Xylenes	
	Trichlorofluoro-methane	5 J

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	127
Toluene-d_8	128
p-Bromofluorobenzene	87

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-4 4'
RFW #: 8602-628-0040
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002899
MATRIX: Soil
METHOD: (LOW/MED LEVEL CLP) (Circle One)
pH: NA % MOISTURE 20.0
DILUTION FACTOR: 8.0

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	80 U
74-83-9	Bromomethane	"
75-01-4	Vinyl Chloride	"
75-00-3	Chloroethane	"
75-09-2	Methylene Chloride	120
67-64-1	Acetone	330
75-15-0	Carbon Disulfide	110
75-35-4	1, 1-Dichloroethene	80 U
75-34-3	1, 1-Dichloroethane	"
156-60-5	Trans-1, 2-Dichloroethene	"
67-66-3	Chloroform	9 J
107-06-2	1, 2-Dichloroethane	80 U
78-93-3	2-Butanone	390
71-55-6	1, 1, 1-Trichloroethane	80 U
56-23-5	Carbon Tetrachloride	"
108-05-4	Vinyl Acetate	"
75-27-4	Bromodichloromethane	"

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1, 2-Dichloropropane	80 U
10061-02-6	Trans-1, 3-Dichloropropene	"
79-01-6	Trichloroethene	"
124-48-1	Dibromochloromethane	"
79-00-5	1, 1, 2-Trichloroethane	"
71-43-2	Benzene	"
10061-01-5	cis-1, 3-Dichloropropene	"
110-75-8	2-Chloroethylvinylether	"
75-25-2	Bromoform	"
591-78-6	4-Methyl-2-Pentanone	"
108-10-1	2-Hexanone	"
127-18-4	Tetrachloroethene	"
79-34-5	1, 1, 2, 2-Tetrachloroethane	"
108-88-3	Toluene	10 J
108-90-7	Chlorobenzene	80 U
100-41-4	Ethylbenzene	"
100-42-5	Styrene	"
	Total Xylenes	"

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	137
Toluene-d_8	114
p-Bromofluorobenzene	108

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: SS-4 11'
RFW #: 8602-628-0050
DATE COLLECTED: 25 February 1986
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002900
MATRIX: Soil
METHOD: (LOW/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE 14.9
DILUTION FACTOR: 1.1

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	11 U
74-83-9	Bromomethane	"
75-01-4	Vinyl Chloride	"
75-00-3	Chloroethane	"
75-09-2	Methylene Chloride	16
67-64-1	Acetone	16
75-15-0	Carbon Disulfide	14
75-35-4	1,1-Dichloroethene	11 U
75-34-3	1,1-Dichloroethane	"
156-60-5	Trans-1,2-Dichloroethene	"
67-66-3	Chloroform	2 J
107-06-2	1,2-Dichloroethane	11 U
78-93-3	2-Butanone	11
71-55-6	1,1,1-Trichloroethane	11 U
56-23-5	Carbon Tetrachloride	"
108-05-4	Vinyl Acetate	"
75-27-4	Bromodichloromethane	"

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1,2-Dichloropropane	11 U
10061-02-6	Trans-1,3-Dichloropropene	"
79-01-6	Trichloroethene	"
124-48-1	Dibromochloromethane	"
79-00-5	1,1,2-Trichloroethane	"
71-43-2	Benzene	"
10061-01-5	cis-1,3-Dichloropropene	"
110-75-8	2-Chloroethylvinylether	"
75-25-2	Bromoform	"
591-78-6	4-Methyl-2-Pentanone	"
108-10-1	2-Hexanone	"
127-18-4	Tetrachloroethene	"
79-34-5	1,1,2,2-Tetrachloroethane	"
108-88-3	Toluene	"
108-90-7	Chlorobenzene	"
100-41-4	Ethylbenzene	"
100-42-5	Styrene	"
	Total Xylenes	"

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	136
Toluene-d_8	119
p-Bromofluorobenzene	110

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

RFW 21-21-009/C-2/86

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: Soil Blank
RFW #: 8602-622/625/628-Blank
DATE COLLECTED: NA
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002891
MATRIX: Soil
METHOD: (LOW)/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE NA
DILUTION FACTOR: 1

CAS Number		ug/l or (ug/Kg) (Circle One)
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	
75-01-4	Vinyl Chloride	
75-00-3	Chloroethane	
75-09-2	Methylene Chloride	7 J
67-64-1	Acetone	5 J
75-15-0	Carbon Disulfide	10 U
75-35-4	1, 1-Dichloroethene	
75-34-3	1, 1-Dichloroethane	
156-60-5	Trans-1, 2-Dichloroethene	
67-66-3	Chloroform	
107-06-2	1, 2-Dichloroethane	
78-93-3	2-Butanone	3 J
71-55-6	1, 1, 1-Trichloroethane	10 U
56-23-5	Carbon Tetrachloride	
108-05-4	Vinyl Acetate	
75-27-4	Bromodichloromethane	

CAS Number		ug/l or (ug/Kg) (Circle One)
78-87-5	1, 2-Dichloropropane	10 U
10061-02-6	Trans-1, 3-Dichloropropene	
79-01-6	Trichloroethene	
124-48-1	Dibromochloromethane	
79-00-5	1, 1, 2-Trichloroethane	
71-43-2	Benzene	
10061-01-5	cis-1, 3-Dichloropropene	
110-75-8	2-Chloroethylvinylether	
75-25-2	Bromoform	
591-78-6	4-Methyl-2-Pentanone	
108-10-1	2-Hexanone	
127-18-4	Tetrachloroethene	
79-34-5	1, 1, 2, 2-Tetrachloroethane	
108-88-3	Toluene	
108-90-7	Chlorobenzene	
100-41-4	Ethylbenzene	
100-42-5	Styrene	
	Total Xylenes	

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	138
Toluene-d_8	115
p-Bromofluorobenzene	98

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen, PH.D.
Manager
WESTON Lionville Analytical Laboratory

ROY F. WESTON, INC.
ORGANIC ANALYSIS DATA SUMMARY
VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

CLIENT: CENTRAL VERMONT RAILWAY-OPTION
SAMPLE DESC: Water Blank
RFW #: 8602-625-Blank
DATE COLLECTED: NA
DATE EXTRACTED: NA
DATE ANALYZED: 3 March 1986
WORK ORDER #:

GC/MS FILE NAME: 0303W002888
MATRIX: Water
METHOD: (LOW)/MED LEVEL CLP (Circle One)
pH: NA % MOISTURE NA
DILUTION FACTOR: 1

CAS Number		(ug/l) or ug/Kg (Circle One)
74-87-3	Chloromethane	10 U
74-83-9	Bromomethane	
75-01-4	Vinyl Chloride	
75-00-3	Chloroethane	
75-09-2	Methylene Chloride	
67-64-1	Acetone	
75-15-0	Carbon Disulfide	
75-35-4	1, 1-Dichloroethene	
75-34-3	1, 1-Dichloroethane	
156-60-5	Trans-1, 2-Dichloroethene	
67-66-3	Chloroform	
107-06-2	1, 2-Dichloroethane	
78-93-3	2-Butanone	
71-55-6	1, 1, 1-Trichloroethane	
56-23-5	Carbon Tetrachloride	
108-05-4	Vinyl Acetate	
75-27-4	Bromodichloromethane	

CAS Number		(ug/l) or ug/Kg (Circle One)
78-87-5	1, 2-Dichloropropane	10 U
10061-02-6	Trans-1, 3-Dichloropropene	
79-01-6	Trichloroethene	
124-48-1	Dibromochloromethane	
79-00-5	1, 1, 2-Trichloroethane	
71-43-2	Benzene	
10061-01-5	cis-1, 3-Dichloropropene	
110-75-8	2-Chloroethylvinylether	
75-25-2	Bromoform	
591-78-6	4-Methyl-2-Pentanone	
108-10-1	2-Hexanone	
127-18-4	Tetrachloroethene	
79-34-5	1, 1, 2, 2-Tetrachloroethane	
108-88-3	Toluene	
108-90-7	Chlorobenzene	
100-41-4	Ethylbenzene	
100-42-5	Styrene	
	Total Xylenes	

SURROGATE RECOVERY:

1,1-Dichloroethane-d_4	106
Toluene-d_8	113
p-Bromofluorobenzene	128

DATA REPORTING QUALIFIERS:
(see narrative for explanation of qualifiers)

U = NOT DETECTED
NR = NOT REQUESTED
J = PRESENT AT LESS THAN DETECTION LIMIT
B = ANALYTE FOUND IN BLANK

COMMENT:

DATE: 19 March 1986

APPROVED BY:

Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Lionville Analytical Laboratory

WESTON Analytics
CVR Option, Waters and Sediment BNA's
W.O. No. 2715-02-01
RFW #8602-622/625/628

Case Narrative

1. The following qualifiers are used on the data summary:

   U - Indicates that the compound was analyzed for but not detected. The minimum detection limit for the sample (not the method detection limit) is reported with the U (e.g., 10U).

   J - Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the specified detection limit but greater than zero (e.g., 10J). If limit of detection 10 ug/l and a concentration of 3 ug/l is calculated, it is reported as 3J.

   BS - Indicates blank spike in which reagent grade water is spiked with the CLP BNA matrix spiking solution and carried through all the steps in the method. Spike recoveries are reported.

   BSD - Indicates blank spike duplicate.

   MS - Indicates matrix spike.

   MSD - Indicates matrix spike duplicate.

   DL - Indicates that surrogate recoveries were not obtained because the extract had to be diluted for analysis.

   NA - Not applicable.

   DF - Dilution factor.

   NR - Not required.

2. The method detection limit is 10X the dilution factor for all compounds on the BNA list except those noted with a (2) or (3) which are 50X and 20X the dilution factor, respectively.

3. The analysis methods were those described in Determination of Extractable Base Neutral and Acid (semi-volatile) Organic Compounds", Statement of Work for Organic Analysis, USEPA Contract Laboratory Program, 7/85 revision.

4. Sediment samples were:

   collected: 2/24,25,26/86
   extracted: 3/3,10/86
   analyzed: 3/25,26/86

   All holding times were met.

5. Elutriations were done on 2/28, 3/1/86; elutriates were:

   extracted: 3/4/86
   analyzed: 3/5/86

   All holding times were met.

6. All sediment samples were extracted on 3/3/86; however, the automated gel permeation chromatograph malfunctioned and the blank, BS, BSD, and several samples were lost. All samples were re-extracted 3/10/86, and both sets of extracts were analyzed. Data for 3/3 extracts (8602-622-0020,0020 dup., 0020 spike, -625-0060) in which acceptable surrogate recoveries indicated their usability are reported. The remaining data are reported from the 3/10 extracts.

7. All surrogate recoveries are within EPA QC limits.

WESTON ANALYTICS
GC/MS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: 8602-622/628 Client: CVR OPTION

Sample Information / MDL=10xD.F.,except (2)=50x,(3)=20x							
	Cust ID:	NA	NA	NA	SS-1	SS-1 DUP	SS-1 SPIKE
	RFW#:	BLANK	BS	BSD	622-0020	622-0020DUP	0020 S
	Matrix:	NA	NA	NA	SEDIMENT	SEDIMENT	SEDIMENT
	D.F.:	35	35	35	43	42	43
	Units:	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG	UG/KG
Surrogate Recovery (%)	2-Fluorophenol:	61 %	73 %	60 %	61 %	63 %	61 %
	Phenol-d5:	56 %	72 %	63 %	62 %	62 %	61 %
	2,4,6-Br3-Phenol:	54 %	77 %	70 %	60 %	74 %	72 %
	Nitrobenzene-d5:	54 %	73 %	61 %	67 %	68 %	67 %
	2-Fluorobiphenyl:	64 %	73 %	66 %	66 %	68 %	63 %
	p-Terphenyl-d14:	78 %	80 %	74 %	70 %	82 %	79 %
		fl	fl	fl	fl	fl	fl
Phenol		350 U	52 %	44 %	430 U	420 U	40 %
bis(2-Chloroethyl)Ether		350 U	350 U	350 U	430 U	420 U	430 U
2-Chlorophenol		350 U	63 %	55 %	430 U	420 U	51 %
1,3-Dichlorobenzene		350 U	350 U	350 U	430 U	420 U	430 U
1,4-Dichlorobenzene		350 U	66 %	56 %	430 U	420 U	52 %
Benzyl Alcohol		350 U	350 U	350 U	430 U	420 U	430 U
1,2-Dichlorobenzene		350 U	350 U	350 U	430 U	420 U	430 U
2-Methylphenol		350 U	350 U	350 U	430 U	420 U	430 U
bis(2-Chloroisopropyl)Ether		350 U	350 U	350 U	430 U	420 U	430 U
4-Methylphenol		350 U	350 U	350 U	430 U	420 U	430 U
N-Nitroso-di-n-propylamine		350 U	70 %	60 %	430 U	420 U	47 %
Hexachloroethane		350 U	350 U	350 U	430 U	420 U	430 U
Nitrobenzene		350 U	350 U	350 U	430 U	420 U	430 U
Isophorone		350 U	350 U	350 U	430 U	420 U	430 U
2-Nitrophenol		350 U	350 U	350 U	430 U	420 U	430 U
2,4-Dimethylphenol		350 U	350 U	350 U	430 U	420 U	430 U
Benzoic Acid(2)		1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
bis(2-Chloroethoxy)Methane		350 U	350 U	350 U	430 U	420 U	430 U
2,4-Dichlorophenol		350 U	350 U	350 U	430 U	420 U	430 U
1,2,4-Trichlorobenzene		350 U	65 %	55 %	430 U	420 U	52 %
Naphthalene		350 U	350 U	350 U	73 J	420 U	430 U
4-Chloroaniline		350 U	350 U	350 U	430 U	420 U	430 U
Hexachlororbutadiene		350 U	350 U	350 U	430 U	420 U	430 U
4-Chloro-3-methylphenol		350 U	62 %	54 %	430 U	420 U	53 %
2-Methylnaphthalene		350 U	350 U	350 U	430 U	420 U	430 U
Hexachlorocyclopentadiene		350 U	350 U	350 U	430 U	420 U	430 U

RFW Batch Number: 8602-622/628 Client: CVR OPTION

Cust ID:	NA	NA	NA	SS-1	SS-1 DUP	SS-1 SPIKE
RFW#:	BLANK	BS	BSD	622-0020	622-0020DUP	0020 S
	fl	fl	fl	fl	fl	fl
2,4,6-Trichlorophenol	350 U	350 U	350 U	430 U	420 U	430 U
2,4,5-Trichlorophenol(2)	1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
2-Chloronaphthalene	350 U	350 U	350 U	430 U	420 U	430 U
2-Nitroaniline(2)	1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
Dimethyl Phthalate	350 U	350 U	350 U	430 U	420 U	430 U
Acenaphthylene	350 U	350 U	350 U	430 U	420 U	430 U
3-Nitroaniline(2)	1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
Acenaphthene	350 U	66 %	60 %	430 U	420 U	53 %
2,4-Dinitrophenol(2)	1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
4-Nitrophenol(2)	1750 U	54 %	48 %	2150 U	2100 U	51 %
Dibenzofuran	350 U	350 U	350 U	430 U	420 U	430 U
2,4-Dinitrotoluene	350 U	58 %	52 %	430 U	420 U	52 %
2,6-Dinitrotoluene	350 U	350 U	350 U	430 U	420 U	430 U
Diethyl Phthalate	350 U	350 U	350 U	430 U	420 U	430 U
4-Chlorophenyl-phenylether	350 U	350 U	350 U	430 U	420 U	430 U
Fluorene	350 U	350 U	350 U	430 U	420 U	430 U
4-Nitroaniline(2)	1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
4,6-Dinitro-2-methylphenol(2)	1750 U	1750 U	1750 U	2150 U	2100 U	2150 U
N-Nitrosodiphenylamine(1)	350 U	350 U	350 U	430 U	420 U	430 U
4-Bromophenyl-phenylether	350 U	350 U	350 U	430 U	420 U	430 U
Hexachlorobenzene	350 U	350 U	350 U	430 U	420 U	430 U
Pentachlorophenol(2)	1750 U	72 %	63 %	2150 U	2100 U	47 %
Phenanthrene	350 U	350 U	350 U	250 J	81 J	86 J
Anthracene	350 U	350 U	350 U	430 U	420 U	430 U
di-n-Butyl Phthalate	350 U	68 %	64 %	430 U	420 U	430 U
Fluoranthene	350 U	350 U	350 U	360 J	113 J	100 J
Pyrene	350 U	73 %	68 %	290 J	124 J	61 %
Butyl Benzyl Phthalate	350 U	350 U	350 U	430 U	420 U	430 U
3,3'-Dichlorobenzidine(3)	700 U	700 U	700 U	860 U	840 U	860 U
Benzo(a)Anthracene	350 U	350 U	350 U	140 J	420 U	430 U
bis(2-Ethylhexyl)Phthalate	350 U	350 U	350 U	430 U	420 U	430 U
Chrysene	350 U	350 U	350 U	190 J	68 J	64 J
di-n-Octyl Phthalate	350 U	350 U	350 U	430 U	420 U	430 U
Benzo(b)Fluoranthene	350 U	350 U	350 U	190 J	420 U	430 U
Benzo(k)Fluoranthene	350 U	350 U	350 U	430 U	420 U	430 U
Benzo(a)Pyrene	350 U	350 U	350 U	120 J	420 U	430 U
Indeno(1,2,3-cd)Pyrene	350 U	350 U	350 U	81 J	420 U	430 U
Dibenz(a,h)Anthracene	350 U	350 U	350 U	430 U	420 U	430 U
Benzo(g,h,i)Perylene	350 U	350 U	350 U	87 J	420 U	430 U

WESTON ANALYTICS
GC/MS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: 8602-622/625/628 Client: CVR OPTION

Sample Information MDL=10xD.F.,except (2)=50x,(3)=20x	Cust ID:	SS-3	SS-2	SS-4			
	RFW#:	625-0060	625-0090	628-0060			
	Matrix:	SEDIMENT	SEDIMENT	SEDIMENT			
	D.F.:	43	42	42	NA	NA	NA
	Units:	UG/KG	UG/KG	UG/KG			
Surrogate Recovery (%)	2-Fluorophenol:	48 %	99 %	79 %	%	%	%
	Phenol-d5:	50 %	97 %	76 %	%	%	%
	2,4,6-Br3-Phenol:	59 %	97 %	106 %	%	%	%
	Nitrobenzene-d5:	51 %	80 %	65 %	%	%	%
	2-Fluorobiphenyl:	53 %	75 %	63 %	%	%	%
	p-Terphenyl-d14:	59 %	85 %	86 %	%	%	%
		fl	fl	fl	fl	fl	fl
Phenol		430 U	420 U	420 U			
bis(2-Chloroethyl)Ether		430 U	420 U	420 U			
2-Chlorophenol		430 U	420 U	420 U			
1,3-Dichlorobenzene		430 U	420 U	420 U			
1,4-Dichlorobenzene		430 U	420 U	420 U			
Benzyl Alcohol		430 U	420 U	420 U			
1,2-Dichlorobenzene		430 U	420 U	420 U			
2-Methylphenol		430 U	420 U	420 U			
bis(2-Chloroisopropyl)Ether		430 U	420 U	420 U			
4-Methylphenol		430 U	420 U	420 U			
N-Nitroso-di-n-propylamine		79 J	420 U	420 U			
Hexachloroethane		430 U	420 U	420 U			
Nitrobenzene		430 U	420 U	420 U			
Isophorone		430 U	420 U	420 U			
2-Nitrophenol		430 U	420 U	420 U			
2,4-Dimethylphenol		430 U	420 U	420 U			
Benzoic Acid(2)		2150 U	2100 U	2100 U			
bis(2-Chloroethoxy)Methane		430 U	420 U	420 U			
2,4-Dichlorophenol		430 U	420 U	420 U			
1,2,4-Trichlorobenzene		110 J	420 U	420 U			
Naphthalene		430 U	420 U	420 U			
4-Chloroaniline		430 U	420 U	420 U			
Hexachlororbutadiene		430 U	420 U	420 U			
4-Chloro-3-methylphenol		180 J	420 U	420 U			
2-Methylnaphthalene		430 U	420 U	420 U			
Hexachlorocyclopentadiene		430 U	420 U	420 U			

RFW Batch Number: 8602-622/625/628 Client: CVR OPTION

Cust ID:	SS-3	SS-2	SS-4
RFW#:	625-0060	625-0090	628-0060
2,4,6-Trichlorophenol	430 U	420 U	420 U
2,4,5-Trichlorophenol(2)	2150 U	2100 U	2100 U
2-Chloronaphthalene	430 U	420 U	420 U
2-Nitroaniline(2)	2150 U	2100 U	2100 U
Dimethyl Phthalate	430 U	420 U	420 U
Acenaphthylene	430 U	420 U	420 U
3-Nitroaniline(2)	2150 U	2100 U	2100 U
Acenaphthene	120 J	420 U	100 J
2,4-Dinitrophenol(2)	2150 U	2100 U	2100 U
4-Nitrophenol(2)	2150 U	2100 U	2100 U
Dibenzofuran	430 U	420 U	88 J
2,4-Dinitrotoluene	430 U	420 U	420 U
2,6-Dinitrotoluene	430 U	420 U	420 U
Diethyl Phthalate	430 U	420 U	420 U
4-Chlorophenyl-phenylether	430 U	420 U	420 U
Fluorene	430 U	420 U	220 J
4-Nitroaniline(2)	2150 U	2100 U	2100 U
4,6-Dinitro-2-methylphenol(2)	2150 U	2100 U	2100 U
N-Nitrosodiphenylamine(1)	430 U	420 U	420 U
4-Bromophenyl-phenylether	430 U	420 U	420 U
Hexachlorobenzene	430 U	420 U	420 U
Pentachlorophenol(2)	2150 U	2100 U	2100 U
Phenanthrene	390 J	400 J	1500
Anthracene	73 J	87 J	480
di-n-Butyl Phthalate	430 U	1020	420 U
Fluoranthene	1000	860	2500
Pyrene	940	860	2100
Butyl Benzyl Phthalate	430 U	800	420 U
3,3'-Dichlorobenzidine(3)	860 U	840 U	840 U
Benzo(a)Anthracene	440	430	1400
bis(2-Ethylhexyl)Phthalate	430 U	420 U	180 J
Chrysene	480	480	1300
di-n-Octyl Phthalate	430 U	420 U	420 U
Benzo(b)Fluoranthene	300 J	530	890
Benzo(k)Fluoranthene	310 J	420 U	720
Benzo(a)Pyrene	420 J	420	1000
Indeno(1,2,3-cd)Pyrene	300 J	310 J	610
Dibenz(a,h)Anthracene	430 U	420 U	210 J
Benzo(g,h,i)Perylene	280 J	320 J	590

WESTON ANALYTICS
GC/MS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: 8602-622/625/628 Client: CVR OPTION

Sample Information MDL=10xD.F.,except (2)=50x,(3)=20x	Cust ID:	NA	NA	NA	SS-1 ELUT	SS-2 ELUT	SS-3 ELUT
	RFW#:	BLANK	BS	BSD	622-0010	625-0010	625-0020
	Matrix:	WATER	WATER	WATER	WATER	WATER	WATER
	D.F.:	1	1	1	1	1	1
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	UG/L
Surrogate Recovery (%)	2-Fluorophenol:	50 %	56 %	49 %	42 %	50 %	51 %
	Phenol-d5:	27 %	36 %	31 %	26 %	30 %	31 %
	2,4,6-Br3-Phenol:	69 %	75 %	68 %	74 %	73 %	72 %
	Nitrobenzene-d5:	82 %	93 %	87 %	84 %	82 %	90 %
	2-Fluorobiphenyl:	84 %	85 %	83 %	78 %	78 %	82 %
	p-Terphenyl-d14:	87 %	88 %	88 %	86 %	81 %	89 %
		fl	fl	fl	fl	fl	fl
Phenol		10 U	29 %	25 %	10 U	10 U	10 U
bis(2-Chloroethyl)Ether		10 U	10 U	10 U	10 U	10 U	10 U
2-Chlorophenol		10 U	77 %	70 %	10 U	10 U	10 U
1,3-Dichlorobenzene		10 U	10 U	10 U	10 U	10 U	10 U
1,4-Dichlorobenzene		10 U	75 %	70 %	10 U	10 U	10 U
Benzyl Alcohol		10 U	10 U	10 U	10 U	10 U	10 U
1,2-Dichlorobenzene		10 U	10 U	10 U	10 U	10 U	10 U
2-Methylphenol		10 U	10 U	10 U	10 U	10 U	10 U
bis(2-Chloroisopropyl)Ether		10 U	10 U	10 U	10 U	10 U	10 U
4-Methylphenol		10 U	10 U	10 U	10 U	10 U	10 U
N-Nitroso-di-n-propylamine		10 U	73 %	65 %	10 U	10 U	10 U
Hexachloroethane		10 U	10 U	10 U	10 U	10 U	10 U
Nitrobenzene		10 U	10 U	10 U	10 U	10 U	10 U
Isophorone		10 U	10 U	10 U	10 U	10 U	10 U
2-Nitrophenol		10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dimethylphenol		10 U	10 U	10 U	10 U	10 U	10 U
Benzoic Acid(2)		50 U	50 U	50 U	50 U	50 U	50 U
bis(2-Chloroethoxy)Methane		10 U	10 U	10 U	10 U	10 U	10 U
2,4-Dichlorophenol		10 U	10 U	10 U	10 U	10 U	10 U
1,2,4-Trichlorobenzene		10 U	72 %	72 %	10 U	10 U	10 U
Naphthalene		10 U	10 U	10 U	10 U	10 U	10 U
4-Chloroaniline		10 U	10 U	10 U	10 U	10 U	10 U
Hexachlororbutadiene		10 U	10 U	10 U	10 U	10 U	10 U
4-Chloro-3-methylphenol		10 U	68 %	61 %	10 U	10 U	10 U
2-Methylnaphthalene		10 U	10 U	10 U	10 U	10 U	10 U
Hexachlorocyclopentadiene		10 U	10 U	10 U	10 U	10 U	10 U

RFW Batch Number: 8602-622/625/628 Client: CVR OPTION Page: 1

Cust ID: / RFW#:	NA BLANK	fl	NA BS	fl	NA BSD	fl	SS-1 ELUT 622-0010	fl	SS-2 ELUT 625-0010	fl	SS-3 ELUT 625-0020	fl
2,4,6-Trichlorophenol	10 U		10 U		10 U		10 U		10 U		10 U	
2,4,5-Trichlorophenol(2)	50 U		50 U		50 U		50 U		50 U		50 U	
2-Chloronaphthalene	10 U		10 U		10 U		10 U		10 U		10 U	
2-Nitroaniline(2)	50 U		50 U		50 U		50 U		50 U		50 U	
Dimethyl Phthalate	10 U		10 U		10 U		10 U		10 U		10 U	
Acenaphthylene	10 U		10 U		10 U		10 U		10 U		10 U	
3-Nitroaniline(2)	50 U		50 U		50 U		50 U		50 U		50 U	
Acenaphthene	10 U		78 %		77 %		10 U		10 U		10 U	
2,4-Dinitrophenol(2)	50 U		50 U		50 U		50 U		50 U		50 U	
4-Nitrophenol(2)	50 U		24 %		28 %		50 U		50 U		50 U	
Dibenzofuran	10 U		10 U		10 U		10 U		10 U		10 U	
2,4-Dinitrotoluene	10 U		60 %		57 %		10 U		10 U		10 U	
2,6-Dinitrotoluene	10 U		10 U		10 U		10 U		10 U		10 U	
Diethyl Phthalate	10 U		10 U		10 U		10 U		1 J		10 U	
4-Chlorophenyl-phenylether	10 U		10 U		10 U		10 U		10 U		10 U	
Fluorene	10 U		10 U		10 U		10 U		10 U		10 U	
4-Nitroaniline(2)	50 U		50 U		50 U		50 U		50 U		50 U	
4,6-Dinitro-2-methylphenol(2)	50 U		50 U		50 U		50 U		50 U		50 U	
N-Nitrosodiphenylamine(1)	10 U		10 U		10 U		10 U		10 U		10 U	
4-Bromophenyl-phenylether	10 U		10 U		10 U		10 U		10 U		10 U	
Hexachlorobenzene	10 U		10 U		10 U		10 U		10 U		10 U	
Pentachlorophenol(2)	50 U		65 %		67 %		8 J		16		50 U	
Phenanthrene	10 U		10 U		10 U		10 U		10 U		10 U	
Anthracene	10 U		10 U		10 U		10 U		10 U		10 U	
di-n-Butyl Phthalate	10 U		82 %		10 U		14		15		5 J	
Fluoranthene	10 U		10 U		10 U		10 U		10 U		10 U	
Pyrene	10 U		87 %		88 %		10 U		10 U		10 U	
Butyl Benzyl Phthalate	10 U		10 U		10 U		10 U		10 U		10 U	
3,3'-Dichlorobenzidine(3)	20 U		20 U		20 U		20 U		20 U		20 U	
Benzo(a)Anthracene	10 U		10 U		10 U		10 U		10 U		10 U	
bis(2-Ethylhexyl)Phthalate	10 U		10 U		10 U		10 U		10 U		10 U	
Chrysene	10 U		10 U		10 U		10 U		10 U		10 U	
di-n-Octyl Phthalate	10 U		10 U		10 U		10 U		10 U		10 U	
Benzo(b)Fluoranthene	10 U		10 U		10 U		10 U		10 U		10 U	
Benzo(k)Fluoranthene	10 U		10 U		10 U		10 U		10 U		10 U	
Benzo(a)Pyrene	10 U		10 U		10 U		10 U		10 U		10 U	
Indeno(1,2,3-cd)Pyrene	10 U		10 U		10 U		10 U		10 U		10 U	
Dibenz(a,h)Anthracene	10 U		10 U		10 U		10 U		10 U		10 U	
Benzo(g,h,i)Perylene	10 U		10 U		10 U		10 U		10 U		10 U	

WESTON ANALYTICS
GC/MS DATA SUMMARY
SEMI-VOLATILE HAZARDOUS SUBSTANCE LIST COMPOUNDS

RFW Batch Number: 8602-622/625/628 Client: CVR OPTION

Sample Information / MDL=10xD.F.,except (2)=50x,(3)=20x							
	Cust ID:	SS3ELUTDUP	SW-1	SW-1 DUP	SS-4ELUT	SS-4ELUTMS	
	RFW#:	625-0020	625-0030	625-0030	628-0010	628-0010MS	
	Matrix:	WATER	WATER	WATER	WATER	WATER	
	D.F.:	1	1	1	1	1.1	NA
	Units:	UG/L	UG/L	UG/L	UG/L	UG/L	
Surrogate Recovery (%)	2-Fluorophenol:	62 %	53 %	53 %	55 %	56 %	%
	Phenol-d5:	38 %	29 %	30 %	33 %	41 %	%
	2,4,6-Br3-Phenol:	68 %	65 %	73 %	74 %	73 %	%
	Nitrobenzene-d5:	67 %	75 %	90 %	88 %	85 %	%
	2-Fluorobiphenyl:	93 %	84 %	93 %	83 %	76 %	%
	p-Terphenyl-d14:	97 %	89 %	100 %	87 %	84 %	%
Phenol		10 U	10 U	10 U	10 U	38 %	
bis(2-Chloroethyl)Ether		10 U	10 U	10 U	10 U	11 U	
2-Chlorophenol		10 U	10 U	10 U	10 U	83 %	
1,3-Dichlorobenzene		10 U	10 U	10 U	10 U	11 U	
1,4-Dichlorobenzene		10 U	10 U	10 U	10 U	80 %	
Benzyl Alcohol		10 U	10 U	10 U	10 U	11 U	
1,2-Dichlorobenzene		10 U	10 U	10 U	10 U	11 U	
2-Methylphenol		10 U	10 U	10 U	10 U	11 U	
bis(2-Chloroisopropyl)Ether		10 U	10 U	10 U	10 U	11 U	
4-Methylphenol		10 U	10 U	10 U	10 U	11 U	
N-Nitroso-di-n-propylamine		10 U	10 U	10 U	10 U	79 %	
Hexachloroethane		10 U	10 U	10 U	10 U	11 U	
Nitrobenzene		10 U	10 U	10 U	10 U	11 U	
Isophorone		10 U	10 U	10 U	10 U	11 U	
2-Nitrophenol		10 U	10 U	10 U	10 U	11 U	
2,4-Dimethylphenol		10 U	10 U	10 U	10 U	11 U	
Benzoic Acid(2)		50 U	50 U	50 U	50 U	55 U	
bis(2-Chloroethoxy)Methane		10 U	10 U	10 U	10 U	11 U	
2,4-Dichlorophenol		10 U	10 U	10 U	10 U	11 U	
1,2,4-Trichlorobenzene		10 U	10 U	10 U	10 U	78 %	
Naphthalene		10 U	10 U	10 U	10 U	11 U	
4-Chloroaniline		10 U	10 U	10 U	10 U	11 U	
Hexachlororbutadiene		10 U	10 U	10 U	10 U	11 U	
4-Chloro-3-methylphenol		10 U	10 U	10 U	10 U	79 %	
2-Methylnaphthalene		10 U	10 U	10 U	10 U	11 U	
Hexachlorocyclopentadiene		10 U	10 U	10 U	10 U	11 U	

Cust ID:	SS3ELUTDUP	SW-1	SW-1 DUP	SS-4ELUT	SS-4ELUTMS
RFW#:	625-0020	625-0030	625-0030	628-0010	628-0010MS
	fl	fl	fl	fl	fl
2,4,6-Trichlorophenol	10 U	10 U	10 U	10 U	11 U
2,4,5-Trichlorophenol(2)	50 U	50 U	50 U	50 U	55 U
2-Chloronaphthalene	10 U	10 U	10 U	10 U	11 U
2-Nitroaniline(2)	50 U	50 U	50 U	50 U	55 U
Dimethyl Phthalate	10 U	10 U	10 U	10 U	11 U
Acenaphthylene	10 U	10 U	10 U	10 U	11 U
3-Nitroaniline(2)	50 U	50 U	50 U	50 U	55 U
Acenaphthene	10 U	10 U	10 U	10 U	84 %
2,4-Dinitrophenol(2)	50 U	50 U	50 U	50 U	55 U
4-Nitrophenol(2)	50 U	50 U	50 U	50 U	37 %
Dibenzofuran	10 U	10 U	10 U	10 U	11 U
2,4-Dinitrotoluene	10 U	10 U	10 U	10 U	70 %
2,6-Dinitrotoluene	10 U	10 U	10 U	10 U	11 U
Diethyl Phthalate	10 U	10 U	10 U	10 U	11 U
4-Chlorophenyl-phenylether	10 U	10 U	10 U	10 U	11 U
Fluorene	10 U	10 U	10 U	10 U	11 U
4-Nitroaniline(2)	50 U	50 U	50 U	50 U	55 U
4,6-Dinitro-2-methylphenol(2)	50 U	50 U	50 U	50 U	55 U
N-Nitrosodiphenylamine(1)	10 U	10 U	10 U	10 U	11 U
4-Bromophenyl-phenylether	10 U	10 U	10 U	10 U	11 U
Hexachlorobenzene	10 U	10 U	10 U	10 U	11 U
Pentachlorophenol(2)	50 U	50 U	50 U	50 U	103 %
Phenanthrene	10 U	10 U	10 U	10 U	11 U
Anthracene	10 U	10 U	10 U	10 U	11 U
di-n-Butyl Phthalate	7 J	10 U	10 U	9 J	95 %
Fluoranthene	10 U	10 U	10 U	10 U	11 U
Pyrene	10 U	10 U	10 U	10 U	91 %
Butyl Benzyl Phthalate	10 U	10 U	10 U	10 U	11 U
3,3'-Dichlorobenzidine(3)	20 U	20 U	20 U	20 U	22 U
Benzo(a)Anthracene	10 U	10 U	10 U	10 U	11 U
bis(2-Ethylhexyl)Phthalate	10 U	10 U	10 U	10 U	11 U
Chrysene	10 U	10 U	10 U	10 U	11 U
di-n-Octyl Phthalate	10 U	10 U	10 U	10 U	11 U
Benzo(b)Fluoranthene	10 U	10 U	10 U	10 U	11 U
Benzo(k)Fluoranthene	10 U	10 U	10 U	10 U	11 U
Benzo(a)Pyrene	10 U	10 U	10 U	10 U	11 U
Indeno(1,2,3-cd)Pyrene	10 U	10 U	10 U	10 U	11 U
Dibenz(a,h)Anthracene	10 U	10 U	10 U	10 U	11 U
Benzo(g,h,i)Perylene	10 U	10 U	10 U	10 U	11 U

DATE OF REPORT: March 7, 1986

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
FOR
CVR - OPTION
WATER-PESTICIDE/PCB SUMMARY REPORT

			622-0010				
R.F.W. NO.: 8602-	Det. Limit	622-0010	Duplicate	625-0010	625-0020	625-0030	628-0010
SAMPLE DESCRIPTION:	---	SS-1	SS-1	SS-2	SS-3	Sw-1	SS-4
DATE COLLECTED:	---	2-24-86	2-24-86	2-25-86	2-25-86	2-25-86	2-25-86
DATE EXTRACTED:	---	3-3-86	3-3-86	3-3-86	3-3-86	3-3-86	3-3-86
DATE ANALYZED:	---	3-6-86	3-6-86	3-6-86	3-6-86	3-6-86	3-6-86
PARAMETER, ug/L							
Alpha-BHC	.005	ND	ND	ND	ND	ND<.01	ND
Beta-BHC	.005						
Delta-BHC	.005						
Gamma-BHC(Lindane)	.005						
Heptachlor	.005						
Aldrin	.005						
Heptachlor Epoxide	.005						
Endosulfan I	.005						
Dieldrin	.005						
4,4-DDE	.005						
Endrin	.005						
Endosulfan II	.005						
4,4-DDD	.005						
Endrin Aldehyde	.005						
Endosulfan Sulfate	.005						
4,4-DDT	.005						
Methoxychlor	.005						
Endrin Ketone	.005						
Chlordane	.005						
Toxaphene	.005						
Aroclor-1016	.05					ND<.10	
Aroclor-1221	.05						
Aroclor-1232	.05						
Aroclor-1242	.05						
Aroclor-1248	.05						
Aroclor-1254	.05						
Aroclor-1260	.05						

N.S. = Not Spiked

N.D. = Not Detected < detection limit

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: March 7, 1986

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
FOR
CVR - OPTION
WATER-PESTICIDE/PCB SUMMARY REPORT

R.F.W. NO.: 8602-	Blank	Blank Spike	Blank Spike Duplicate	625-0010MS			
SAMPLE DESCRIPTION:	---	---	---	SS-2			
DATE COLLECTED:	---	---	---	2-25-86			
DATE EXTRACTED:	3-3-86	3-3-86	3-3-86	3-3-86			
DATE ANALYZED:	3-6-86	3-6-86	3-6-86	3-6-86			
PARAMETER, µg/L							
Alpha-BHC	ND	NS	NS	NS			
Beta-BHC							
Delta-BHC							
Gamma-BHC(Lindane)		65%	71%	55%			
Heptachlor		71%	78%	53%			
Aldrin		67%	75%	56%			
Heptachlor Epoxide							
Endosulfan I							
Dieldrin		67%	74%	60%			
4,4-DDE							
Endrin		65%	71%	58%			
Endosulfan II							
4,4-DDD							
Endrin Aldehyde							
Endosulfan Sulfate							
4,4-DDT		102%	111%	87%			
Methoxychlor							
Endrin Ketone							
Chlordane							
Toxaphene							
Aroclor-1016							
Aroclor-1221							
Aroclor-1232							
Aroclor-1242							
Aroclor-1248							
Aroclor-1254							
Aroclor-1260							

N.S. = Not Spiked

N.D. = Not Detected < detection limit

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: 25 March 1986

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
FOR CVR OPTION

SOIL-PESTICIDE/PCB SUMMARY REPORT

R.F.W. NO.: 8602-	DETECTION LIMITS	622-0020	622-0020 DUP	622-0020 SP.	625-0060	625-0090	628-0060
SAMPLE DESCRIPTION:		SS-1	SS-1	SS-1	SS-3	SS-2	SS-4
DATE COLLECTED:		2-24-86	2-24-86	2-24-86	2-25-86	2-25-86	2-25-86
DATE EXTRACTED:		3-10-86	3-10-86	3-10-86	3-10-86	3-10-86	3-10-86
DATE ANALYZED:		3-24-86	3-24-86	3-24-86	3-24-86	3-24-86	3-24-86
PARAMETER, ug/kg							
Alpha-BHC	10	ND	ND	NS	ND	ND	ND
Beta-BHC	10						
Delta-BHC	10						
Gamma-BHC(Lindane)	10			83%			
Heptachlor	10			80%			
Aldrin	10			79%			
Heptachlor Epoxide	10			NS			
Endosulfan I	10						
Dieldrin	20			94%			
4,4-DDE	20			NS			
Endrin	20			86%			
Endosulfan II	20			NS			
4,4-DDD	20						17J
Endrin Aldehyde	20						ND
Endosulfan Sulfate	20						
4,4-DDT	20			112%			
Methoxychlor	100			NS			
Endrin Ketone	20						
Chlordane	100						
Toxaphene	200						
Aroclor-1016	100						
Aroclor-1221	100						
Aroclor-1232	100						
Aroclor-1242	100						
Aroclor-1248	100						
Aroclor-1254	200						
Aroclor-1260	200						

N.S. = Not Spiked

N.D. = Not Detected < detection limit

Approved By: Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: 25 March 1986

ROY F. WESTON
ORGANIC ANALYSIS DATA SUMMARY
FOR CVR OPTION

SOIL-PESTICIDE/PCB SUMMARY REPORT

	622/625/	622/625/	622/625/				
R.F.W. NO.: 8602	628	628	628				
SAMPLE DESCRIPTION:	Blank	Bl. Spike	Bl Sp Dup				
DATE COLLECTED:							
DATE EXTRACTED:							
DATE ANALYZED:							
PARAMETER, µg/kg							
Alpha-BHC	ND	NS	NS				
Beta-BHC	〃	〃	〃				
Delta-BHC	〃	〃	〃				
Gamma-BHC(Lindane)	〃	87%	100%				
Heptachlor	〃	90%	91%				
Aldrin	〃	86%	97%				
Heptachlor Epoxide	〃	NS	NS				
Endosulfan I	〃	〃	〃				
Dieldrin	〃	94%	107%				
4,4-DDE	〃	NS	NS				
Endrin	〃	83%	94%				
Endosulfan II	〃	NS	NS				
4,4-DDD	〃	〃	〃				
Endrin Aldehyde	〃	〃	〃				
Endosulfan Sulfate	〃	〃	〃				
4,4-DDT	〃	92%	112%				
Methoxychlor	〃	NS	NS				
Endrin Ketone	〃	〃	〃				
Chlordane	〃	〃	〃				
Toxaphene	〃	〃	〃				
Aroclor-1016	〃	〃	〃				
Aroclor-1221	〃	〃	〃				
Aroclor-1232	〃	〃	〃				
Aroclor-1242	〃	〃	〃				
Aroclor-1248	〃	〃	〃				
Aroclor-1254	〃	〃	〃				
Aroclor-1260	〃	〃	〃				

N.S. = Not Spiked

N.D. = Not Detected < detection limit

Approved By Earl M. Hansen

Earl M. Hansen, Ph.D.
Manager
WESTON Analytical Laboratories

DATE OF REPORT: 04/22/86

CLIENT: CVR OPTION
DATA SUMMARY REPORT FOR
SAMPLES RECEIVED: 2-25-86
W.O.NUMBER: 2715-02-01
DATE SAMPLE COLLECTED: 2-24-86
SAMPLE COLLECTED BY:. R. RICARD

RFWSN	DESCRIPTION	AS,T MG/KG	AS,T MG/L	CD,T MG/KG	CD,T MG/L	CR,T MG/KG	CR,T MG/L	CU,T MG/KG
8602-622-0010	SS-1 ELUTRIATE		<.010		<.0025		.011	
-0020	SS-1 SEDIMENT	1.27		<.482		6.85		4.54
-002K	SS-1 MATRIX SPIKE	4.33		.517		26.7		34.3
-002K	SPIKE RECOVERY	76.5%		82.2%		99.3%		119%
-002R	SS-1 REPLICATE	1.28		<.486		7.68		5.25
-002S	PRECISION	0.78%		NC		11.42%		14.50%
	METHOD BLANK	<1.00	<.010	<.500	<.0025	<2.50	<.010	<1.00
	METHOD BLANK	<1.00	<.010	<.500	<.0025	<2.50	<.010	<1.00
	METHOD SPIKE	3.89	.026	.570	.010	17.5	.215	30.6
	SPIKE RECOVERY	97.3%	131%	114%	200%	87.5%	108%	122%
	METHOD SPIKE	3.95	.025	.610	.009	18.3	.226	31.1
	SPIKE RECOVERY	98.8%	128%	122%	186%	91.5%	113%	124%

RFWSN	DESCRIPTION	CU,T MG/L	HG,T UG/G	HG,T UG/L	NI,T MG/KG	NI,T MG/L	PB,T MG/KG	PB,T MG/L
8602-622-0010	SS-1 ELUTRIATE	<.010		<.5		<.010		.014
-0020	SS-1 SEDIMENT		<.250		8.59		21.6	
-002K	SS-1 MATRIX SPIKE				54.7			
-002K	SPIKE RECOVERY				92.2%			
-002R	SS-1 REPLICATE				8.75		20.7	
-002S	PRECISION				1.85%		4.26%	
	METHOD BLANK	<.010		<.5	<1.00		<.500	.006
	METHOD BLANK	<.010			<1.00		<.500	.006
	METHOD SPIKE	.290		1.85	51.7		5.90	.049
	SPIKE RECOVERY	116%		92.5%	103%		61.8%	163%
	METHOD SPIKE	.294			51.3		5.83	.044
	SPIKE RECOVERY	118%			103%		152%	146%
	METHOD SPIKE							.040
	SPIKE RECOVERY							124%
	METHOD SPIKE							.061
	SPIKE RECOVERY							186%

RFWSN	DESCRIPTION	ZN MG/KG	ZN MG/L	CU,S MG/L	HG,S UG/L	PB,S MG/L	ZN,S MG/L
8602-622-0010	SS-1 ELUTRIATE		.028	.068	<.5	.005	.055
-0020	SS-1 SEDIMENT	23.9					
-002K	SS-1 MATRIX SPIKE	66.2					
-002K	SPIKE RECOVERY	84.6%					
-002R	SS-1 REPLICATE	24.1					
-002S	PRECISION	0.83%					
	METHOD BLANK	1.70	.018	<.010	<.5	<.005	<.010
	METHOD BLANK	1.10	.012				
	METHOD SPIKE	50.1	.230	.323	7.6	.050	.225
	SPIKE RECOVERY	100%	115%	129%	87%	164%	113%
	METHOD SPIKE	49.4	.218	.322		.044	.230
	SPIKE RECOVERY	98.8%	109%	129%		145%	115%

RFWSN	DESCRIPTION	PERCENT MOISTURE	BOD5	nitrate nitrite
3602-622-0010	SS-1 ELUTRIATE		195 MG/L	.40 MG/L
-0020	SS-1 SEDIMENT	21.2 %		.50 UG/G
	METHOD BLANK			<.2 MG/L
	METHOD SPIKE			2.10 MG/L
	SPIKE RECOVERY			105 %

RFWSN	DESCRIPTION	NITROGEN - AMMONIA	OIL & GREASE	PH
3602-622-0010	SS-1 ELUTRIATE	<0.10 MG/L	<1 MG/L	7.40 PHUNT
-0020	SS-1 SEDIMENT	<10 UG/G	8.59 MG	
-002K	SS-1 MATRIX SPIKE		19.7 MG	
-002K	SPIKE RECOVERY		102 %	
-002R	SS-1 REPLICATE		305 MG/KG	
-002S	PRECISION		13.74 %	
	METHOD BLANK	<0.03 MG/L	<10 MG/KG	
	METHOD SPIKE	.250 MG/L		
	SPIKE RECOVERY	89.3 %		
	METHOD SPIKE		90.3 MG/L	
	SPIKE RECOVERY		112 %	
	METHOD SPIKE		10.8 MG	
	SPIKE RECOVERY		98.6 %	

RFWSN	DESCRIPTION	PHOSPHORUS	TOTAL VOLATILE SOLIDS
3602-622-0010	SS-1 ELUTRIATE	<.02 MG/L	
-0020	SS-1 SEDIMENT	383 UG/G	21.6 %
-002R	SS-1 REPLICATE	370 UG/G	
-002S	PRECISION	3.45 %	
	METHOD BLANK	<10 UG/G	
	METHOD SPIKE	.099 MG/L	
	SPIKE RECOVERY	98.8 %	

RFWSN	DESCRIPTION	TOTAL KJELDAHL NITROGEN
3602-622-0010	SS-1 ELUTRIATE	.360 MG/L
-0020	SS-1 SEDIMENT	97.3 UG/G
-002K	SS-1 MATRIX SPIKE	190 UG/G
-002K	SPIKE RECOVERY	75.1 %
-002R	SS-1 REPLICATE	97.3 UG/G
	METHOD BLANK	<0.10 MG/L
	METHOD SPIKE	11.5 UG/G
	SPIKE RECOVERY	90.0 %
	METHOD SPIKE	92.5 UG/G
	SPIKE RECOVERY	90.0 %
	METHOD SPIKE	49.8 UG/G
	SPIKE RECOVERY	94.6 %

PREPARED BY
STEPHANIE DOBBS
DATA MANAGER
WESTON ANALYTICAL LABORATORIES

APPROVED BY
EARL M. HANSEN, PH.D.
MANAGER
WESTON ANALYTICAL LABORATORIES

DATE OF REPORT: 04/22/86

CLIENT: CVR OPTION
DATA SUMMARY REPORT FOR
SAMPLES RECEIVED: 2-25-86
W.O.NUMBER: 2415-02-01
ATE SAMPLE COLLECTED: 2-25-86
SAMPLE COLLECTED BY:. R. RICARD

RFWSN	DESCRIPTION	AS,T MG/KG	AS,T MG/L	CD,T MG/KG	CD,T MG/L	CR,T MG/KG	CR,T MG/L	CU,T MG/KG
8602-625-0010	SS-2 ELUTRIATE		<.010		<.0025		.018	
-0020	SS-3 ELUTRIATE		<.010		<.0025		<.010	
-002K	SS-3 MATRIX SPIKE		.025					
-002K	SPIKE RECOVERY		127%					
-002R	SS-3 REPLICATE		<.010					
-002S	PRECISION		NC					
-0030	SW-1		<.010		<.0025		.019	
-003K	SW-1 MATRIX SPIKE		.024					
-003K	SPIKE RECOVERY		125%					
-003R	REPLICATE		<.010					
-003S	PRECISION		NC					
-0060	SS-3 SEDIMENT	1.43		<.479		5.26		10.7
-006K	SS-3 MATRIX SPIKE	4.57		.611		25.9		38.5
-006K	SPIKE RECOVERY	78.5%		109%		103%		111%
-006R	SS-3 REPLICATE	1.45		<.490		6.57		8.53
-006S	PRECISION	1.39%		NC		22.15%		22.57%
-0090	SS-2 SEDIMENT	1.56		<.502		7.33		12.3

RFWSN	DESCRIPTION	CU,T MG/L	HG,T UG/G	HG,T UG/L	NI,T MG/KG	NI,T MG/L	PB,T MG/KG	PB,T MG/L
502-625-0010	SS-2 ELUTRIATE	<.010		.681		<.010		.414
-0020	SS-3 ELUTRIATE	<.010		<.5		<.010		.005
-002K	SS-3MATRIX SPIKE	.292						.032
-002K	SPIKE RECOVERY	116%						97.0%
-002R	SS-3REPLICATE	<.010						<.005
-002S	PRECISION	NC						NC
-0030	SW-1	<.010		<.5		<.010		.010
-003K	SW-1MATRIX SPIKE	.293						.036
-003K	SPIKE RECOVERY	117%						107%
-003R	SW-1 REPLICATE	<.010						<.005
-003S	PRECISION	NC						NC
-0060	SS-3 SEDIMENT		<.250		9.48		31.9	
-006K	SS-3 MATRIX SPIKE				54.7		48.6	
-006K	SPIKE RECOVERY				90.4%		52%	
-006R	SS-3REPLICATE				9.32		46.0	
-006S	PRECISION				1.70%		36.20%	
-0090	SS-2 SEDIMENT		<.250		9.43		33.6	
	METHOD BLANK			<.5				
	METHOD SPIKE			1.85				
	SPIKE RECOVERY			92.5%				

RFWSN	DESCRIPTION	ZN,T MG/KG	ZN,T MG/L	CU,S MG/L	HG,S UG/L	PB,S MG/L	ZN,S MG/L
602-625-0010	SS-2 ELUTRIATE		.018	.077	<.5	<.005	.044
-001K	SS-2MATRIX SPIKE		.260				
-001K	SPIKE RECOVERY		111%				
-001R	SS-2 ELUTRIATE		.030				
-0020	SS-3 ELUTRIATE		.037	.080	1.9	<.005	.050
-0030	SW-1		.017	.083	.6	<.005	.027
-003K	SW-1MATRIX SPIKE		.237	.312		.036	.234
-003K	SPIKE RECOVERY		110%	125%		118%	117%
-003R	SW-1REPLICATE		<.010	.083		<.005	.023
-003S	PRECISION		NC				
-0060	SS-3 SEDIMENT	38.0					
-006K	SS-3MATRIX SPIKE	81.4					
-006K	SPIKE RECOVERY	86.8%					
-006R	SS-3REPLICATE	39.8					
-006S	PRECISION	4.63%					
-0090	SS-2 SEDIMENT	31.1					
	METHOD BLANK				<.5		
	METHOD SPIKE				7.6		
	SPIKE RECOVERY				87%		

RFWSN	DESCRIPTION	PERCENT MOISTURE	BOD5	NITRATE NITRATE
8602-625-0010	SS-2 ELUTRIATE		90 MG/L	.30 MG/L
-0020	SS-3 ELUTRIATE		>240 MG/L	.20 MG/L
-0030	SW-1		<1 MG/L	.20 MG/L
-0060	SS-3 SEDIMENT	21.3 %		.50 UG/G
-006K	SS-3MATRIX SPIKE			3.10 UG/G
-006K	SPIKE RECOVERY			102 %
-0090	SS-2 SEDIMENT	17.8 %		.750 UG/G
	METHOD BLANK			<.5 UG/G

RFWSN	DESCRIPTION	NITROGEN - AMMONIA	OIL & GREASE	PH
602-625-0010	SS-2 ELUTRIATE	<0.10 MG/L	1 MG/L	7.60 PHUNT
-001R	SS-2REPLICATE		<1 MG/L	
-001S	PRECISION		NC	
-0020	SS-3 ELUTRIATE	.280 MG/L	<1 MG/L	7.50 PHUNT
-002R	SS-3REPLICATE	.290 MG/L		
-002S	PRECISION	3.51 %		
0030	SW-1	<.10 MG/L	<1 MG/L	
-003K	SS-3MATRIX SPIKE	.110 MG/L		
-003K	SPIKE RECOVERY	110 %		
-0060	SS-3 SEDIMENT	<10 UG/G	190 MG/KG	
-0090	SS-2 SEDIMENT	<10 UG/G	125 MG/KG	
-009K	SS-2MATRIX SPIKE	11 UG/G		
-009K	SPIKE RECOVERY	110 %		
-009R	SS-2REPLICATE	<10 UG/G		
-009S	PRECISION	NC		
	METHOD BLANK	<3 UG/G		
	METHOD BLANK	<.03 MG/L		
	METHOD SPIKE	.260 MG/L		
	SPIKE RECOVERY	92.9 %		

RFWSN	DESCRIPTION	PHOSPHORUS	TOTAL VOLATILE SOLIDS
602-625-0010	SS-2 ELUTRIATE	<.05 MG/L	
-0020	SS-3 ELUTRIATE	<.05 MG/L	
-002R	SS-3REPLICATE	<.05 MG/L	
-002S	PRECISION	NC	
-0030	SW-1	<.05 MG/L	
-003K	SW-1MATRIX SPIKE	.267 MG/L	
-003K	SPIKE RECOVERY	101 %	
-0060	SS-3 SEDIMENT	427 UG/G	24.0 %
-006R	SS-3REPLICATE	474 UG/G	
-006S	PRECISION	10.43 %	
-0090	SS-2 SEDIMENT	260 UG/G	
-009R	SS-2REPLICATE	394 UG/G	
-009S	PRECISION	40.98 %	
	METHOD BLANK	<10 UG/G	

RFWSN	DESCRIPTION	TOTAL KJELDAHL NITROGEN
602-625-0010	SS-2 ELUTRIATE	.710 MG/L
-001R	SS-2REPLICATE	.630 MG/L
-001S	PRECISION	11.94 %
-0020	SS-3 ELUTRIATE	.500 MG/L
-0030	SW-1	.270 MG/L
-003K	SW-1MATRIX SPIKE	3.80 MG/L
-003K	SPIKE RECOVERY	88.3 %
-003R	SW-1REPLICATE	.270 MG/L
-003S	PRECISION	7.14 %
-0060	SS-3 SEDIMENT	78.6 UG/G
-0090	SS-2 SEDIMENT	150 UG/G
	METHOD BLANK	.100 MG/L
	METHOD SPIKE	.460 MG/L
	SPIKE RECOVERY	115 %

PREPARED BY Stephanie Dobbs
STEPHANIE DOBBS
DATA MANAGER
WESTON ANALYTICAL LABORATORIES

APPROVED BY Earl M. Hansen
EARL M. HANSEN, PH.D.
MANAGER
WESTON ANALYTICAL LABORATORIES

DATE OF REPORT: 04/22/86

CLIENT: CVR OPTION
DATA SUMMARY REPORT FOR
SAMPLES RECEIVED: 2-27-86
W.O.NUMBER: 2715-02-01
DATE SAMPLE COLLECTED: 2/25-26/86
SAMPLE COLLECTED BY:. R. RICARD

RFWSN	DESCRIPTION	AS,T MG/KG	AS,T MG/L	CD,T MG/KG	CD,T MG/L	CR,T MG/KG	CR,T MG/L	CU,T MG/KG
602-628-0010	SS-4 ELUTRIATE		<.010		<.0025		.016	
-001K	SS-4MATRIX SPIKE				.006		.242	
-001K	SPIKE RECOVERY				166%		113%	
-001R	SS-4REPLICATE				<.0025		.031	
-001S	PRECISION				NC		63.83%	
-0060	SS-4 SEDIMENT	1.31		<.475		8.93		8.26
	METHOD SPIKE				.006			
	SPIKE RECOVERY				134%			
	METHOD SPIKE				.006			
	SPIKE RECOVERY				124%			
	METHOD SPIKE				.007			

RFWSN	DESCRIPTION	CU,T MG/L	HG,T UG/G	HG,T UG/L	NI,T MG/KG	NI,T MG/L	PB,T MG/KG	PB,T MG/L
8602-628-0010	SS-4 ELUTRIATE	<.010		<.5		<.010		.005
-001K	SS-4MATRIX SPIKE	.293		5.49		.394		.040
-001K	SPIKE RECOVERY	116%		110%		98.5%		108%
-001R	SS-4REPLICATE	<.010				<.010		.038
-001S	PRECISION	NC				NC		150.23%
-0060	SS-4 SEDIMENT		<.250		9.88		47.6	
-006K	SS-4MATRIX SPIKE		2.51					
-006K	SPIKE RECOVERY		100%					
-006R	SS-4REPLICATE		<.276					
-006S	PRECISION		NC					
	METHOD BLANK			<.5		<.010		
	METHOD BLANK					<.010		
	METHOD SPIKE			1.85		.395		.061
	SPIKE RECOVERY			92.5%		98.8%		186%
	METHOD SPIKE					.396		
	SPIKE RECOVERY					99.0%		

RFWSN	DESCRIPTION	ZN,T MG/KG	ZN,T MG/L	CU,S MG/L	HG,S UG/L	PB,S MG/L	ZN,S MG/L
8602-628-0010	SS-4 ELUTRIATE		.036	.100	<.5	.005	.043
-001K	SS-4MATRIX SPIKE		.242				
-001K	SPIKE RECOVERY		103%				
-001R	SS-4REPLICATE		.017				
-001S	PRECISION		71.70%				
-0060	SS-4 SEDIMENT	106					
	METHOD BLANK				<.5		
	METHOD SPIKE				7.6		
	SPIKE RECOVERY				87%		

RFWSN	DESCRIPTION	PERCENT MOISTURE	BOD5	CYANIDE TOTAL
8602-628-0010	SS-4 ELUTRIATE		54 MG/L	
-0020	MW-4			<.010 MG/L
-002R	MW-4REPLICATE			<.010 MG/L
-002S	PRECISION			NC
-0030	MW-2			<.010 MG/L
-003K	MW-2MATRIX SPIKE			.093 MG/L
-003K	SPIKE RECOVERY			93.0 %
-0060	SS-4 SEDIMENT	17.6 %		
	METHOD BLANK			<.010 MG/L
	METHOD SPIKE			.510 MG/L
	SPIKE RECOVERY			90.9 %

RFWSN	DESCRIPTION	nitrate nitrite	NITROGEN - AMMONIA
8602-628-0010	SS-4 ELUTRIATE	.30 MG/L	.530 MG/L
-001K	SS-4 MATRIX SPIKE		.590 MG/L
-001K	SPIKE RECOVERY		80.0 %
-001R	SS-4 REPLICATE		.510 MG/L
-001S	PRECISION		3.85 %
-0060	SS-4 SEDIMENT	.50 UG/G	<10 UG/G
	METHOD BLANK	<.2 MG/L	<3 UG/G
	METHOD BLANK		<.03 MG/L
	METHOD SPIKE		.250 MG/L
	SPIKE RECOVERY		92.9 %
	METHOD SPIKE	2.10 MG/L	
	SPIKE RECOVERY	105 %	

RFWSN	DESCRIPTION	OIL & GREASE	PH	PHOSPHORUS
8602-628-0010	SS-4 ELUTRIATE	3 MG/L	7.70 PHUNT	<.05 MG/L
-0020	MW-4	11 MG/L		
-002K	MW-4MATRIX SPIKE	174 MG/L		
-002K	SPIKE RECOVERY	95.9 %		
-0030	MW-2	2 MG/L		
-0060	SS-4 SEDIMENT	1400 MG/KG		381 UG/G
-006K	SS-4MATRIX SPIKE			435 UG/G
-006K	SPIKE RECOVERY			168 %
	METHOD BLANK			<.02 MG/L
	METHOD BLANK			<10 UG/G
	METHOD SPIKE			.089 MG/L
	SPIKE RECOVERY			99.0 %
	METHOD SPIKE			54.4 UG/G
	SPIKE RECOVERY			109 %

RFWSN	DESCRIPTION	TOTAL VOLATILE SOLIDS	TOTAL KJELDAHL NITROGEN
&602-628-0010	SS-4 ELUTRIATE		.900 MG/L
-001K	SS-4MATRIX SPIKE		4.60 MG/L
-001K	SPIKE RECOVERY		92.5 %
-0060	SS-4 SEDIMENT	20.4 %	4.22 UG/G
	METHOD BLANK		<1.0 UG/G
	METHOD SPIKE		11.5 UG/G
	SPIKE RECOVERY		90.0 %
	METHOD SPIKE		3.72 MG/L
	METHOD SPIKE		.500 MG/L
	SPIKE RECOVERY		125 %

PREPARED BY Stephanie Dobbs
STEPHANIE DOBBS
DATA MANAGER
WESTON ANALYTICAL LABORATORIES

APPROVED BY Earl M. Hansen
EARL M. HANSEN, PH.D.
MANAGER
WESTON ANALYTICAL LABORATORIES